Most children affected by opioids in the United States in 2017— nearly 1.6 million out of the total 2.2 million— were under the age of 12. Growing up in a household with substance use exposure is an adverse childhood experience (ACE) and can make children vulnerable to additional ACEs, such as abuse and neglect, loss or separation from a parent, or exposure to violence. The presence of such potentially traumatic experiences can be especially harmful to young children, as it can interfere with brain development. Recent research, however, teaches us that these ACEs can be prevented or their impact reduced, if these children and their families receive appropriate support.

Figure 6

Number of children affected by the opioid epidemic in 2017 by age

Ages 0–5

904,000

Ages 6–11

662,000

Ages 12–17

610,000

Children affected by the opioid epidemic will likely incur higher expenses during childhood, a trend that persists into adulthood. This lifetime societal cost is estimated to be $180 billion for the 2.2 million children affected in 2017. This cost has two components: $117.5 billion incurred during the years of childhood that stems from higher expenses on health care, child welfare, and special education; and $62.1 billion in long-term expenses that accrue during adulthood (see Figure 8 for more information on these costs). The $180 billion estimate does not include missed opportunities or productivity losses, which could be significant.

The bulk of the costs that accrue during childhood are for additional general health care and special education services.

Two sets of estimates are provided—a per-child cost and a total cost across the population—to assist policymakers in shaping appropriate interventions.

Total estimated lifetime societal cost
$180 billion

Figure 7

Societal cost during childhood
(based on 2.2 million children affected in 2017)

		Average cost per child		Total in billions
	Higher overall health care expenditure	**$37K**	Health care	**$74**
32K	children born with NAS each year	**$16K**	Treatment	**$.50**
125K	adolescents treated for OUD	**$6K**	Treatment	**$.80**
75K	children entering foster care every year due to opioids	**$44K**	Child welfare and social programs	**$3.20**
75%	more likely to need special education	**$186K**	Special education	**$39**
				$117.5

NOTES:

1. Estimated increases in general health care and special education needs during childhood are based on analyses of costs associated with children who were subjects of child maltreatment investigations (not necessarily substantiated). Child maltreatment was defined by the researchers as both abuse (physical, psychological, or sexual) and neglect.
2. Lifetime cost means the aggregate cost over 50 years.
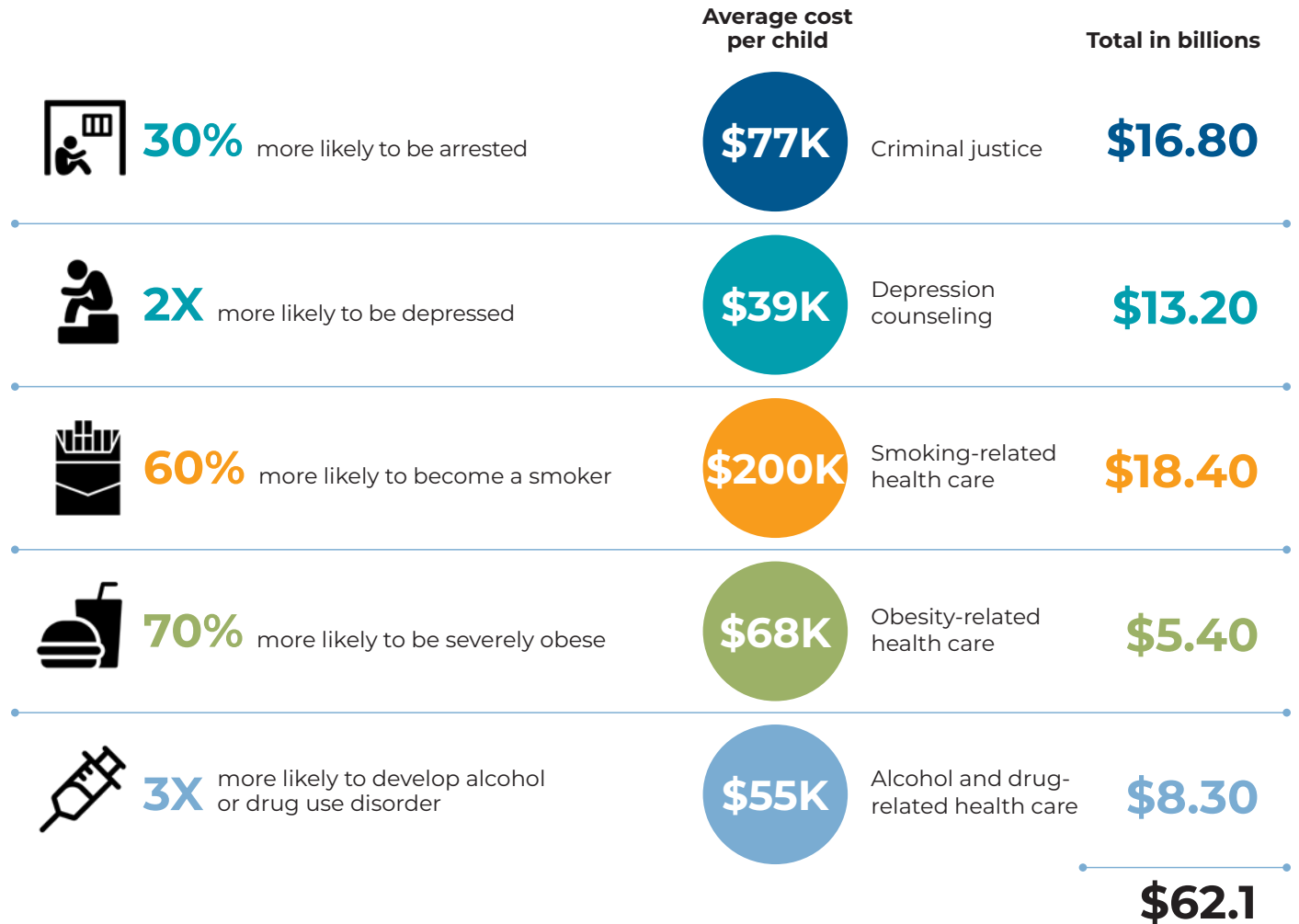3. Estimate assumes 75% of adolescents with OUD would receive Medication Assisted Treatment.

The effects of adverse childhood experiences (ACEs) can be long-lasting and extend into adulthood. It is estimated that children of parents with substance use disorders have an average of 2.1 ACEs. A greater number of ACEs during childhood has been associated with increased risky behaviors, such as smoking and alcohol/drug use, in adulthood, and chronic disease, including depression. All told, the long-term cost due to adverse childhood experiences accounts for more than $62 billion out of the total estimated societal cost of $180 billion over the lifetime of these children.

The two sets of estimates provided—a per-child cost and a total cost across the population—are intended to assist policymakers in shaping appropriate interventions.

Total estimated lifetime societal cost
$180 billion

Figure 8

Long-term societal cost
(based on 2.2 million children affected in 2017)

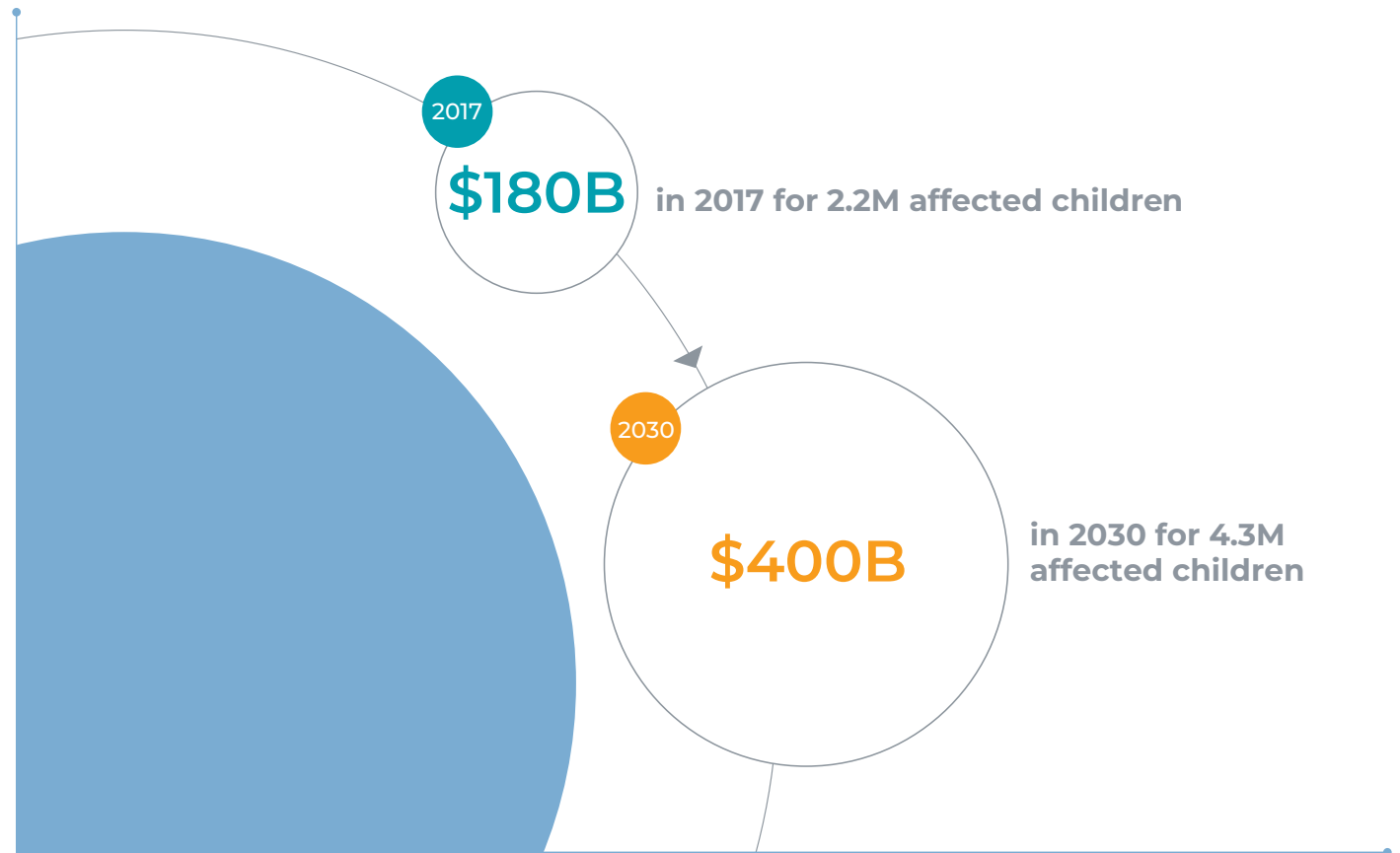|	Average cost per child		Total in billions
30% more likely to be arrested	**$77K**	Criminal justice	**$16.80**
2X more likely to be depressed	**$39K**	Depression counseling	**$13.20**
60% more likely to become a smoker	**$200K**	Smoking-related health care	**$18.40**
70% more likely to be severely obese	**$68K**	Obesity-related health care	**$5.40**
3X more likely to develop alcohol or drug use disorder	**$55K**	Alcohol and drug-related health care	**$8.30**
			$62.1

NOTE:

1. Lifetime cost means the aggregate cost over 50 years.

Figure 9

Lifetime societal cost of the opioid epidemic's impact on children in 2030

By 2030 the societal cost of the opioid epidemic's impact on children could increase to $400 billion. This includes the estimated lifetime cost of the impact on children already identified in the 2017 estimate plus the estimated lifetime costs of children projected to be newly affected between 2018 and 2030. While not all children will be equally affected, the findings suggest that, on a national level, the ripple effect will be enormously expensive. But the toll on children, and the economic consequences that could result, are not inevitable. There are several strategies that can reduce some of these expenses: increased upfront investments supporting the health and well-being of children exposed to adverse childhood experiences, including parental SUD; tailored SUD programs for adolescents; and expanded opioid treatment programs that meet the needs of parents.

2017

$180B in 2017 for 2.2M affected children

2030

$400B in 2030 for 4.3M affected children

NOTES:

1. Estimated costs in 2030 are derived from the "base scenario" assumptions from Figure 2.
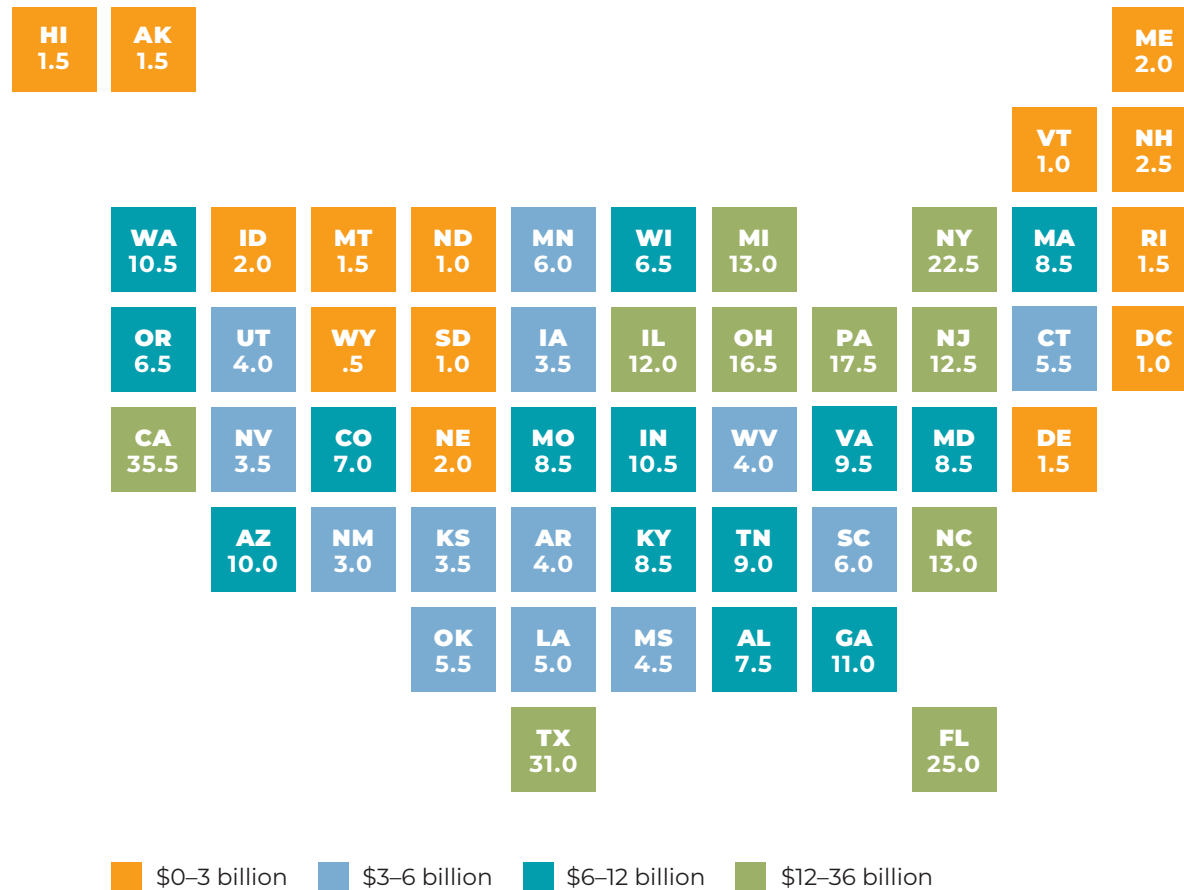
Figure 10

Projected societal cost of the opioid epidemic by state
(based on estimated 4.3 million children affected as of 2030)

Projected 2030 costs are attributed to states based on each state's proportion of affected children in 2017.

California, with the largest number of affected children, is projected to face a cost of $35.5 billion. The average cost for a state is projected to be $5 billion.

Total cost

$400 billion

HI 1.5	AK 1.5									ME 2.0
								VT 1.0		NH 2.5
WA 10.5	ID 2.0	MT 1.5	ND 1.0	MN 6.0	WI 6.5	MI 13.0		NY 22.5	MA 8.5	RI 1.5
OR 6.5	UT 4.0	WY .5	SD 1.0	IA 3.5	IL 12.0	OH 16.5	PA 17.5	NJ 12.5	CT 5.5	DC 1.0
CA 35.5	NV 3.5	CO 7.0	NE 2.0	MO 8.5	IN 10.5	WV 4.0	VA 9.5	MD 8.5	DE 1.5	
	AZ 10.0	NM 3.0	KS 3.5	AR 4.0	KY 8.5	TN 9.0	SC 6.0	NC 13.0		
			OK 5.5	LA 5.0	MS 4.5	AL 7.5	GA 11.0			
			TX 31.0				FL 25.0			

Legend:
- $0–3 billion
- $3–6 billion
- $6–12 billion
- $12–36 billion

NOTES:

1. The state costs in 2030 are based on the national average cost in 2018. They do not consider regional variances in health care, social service, or other sector costs.

Conclusion

The estimates presented in this report suggest that the opioid epidemic's costs are substantial and wide-ranging. These include financial consequences, of course, but they also include a steep human toll—lives cut short and families disrupted. As succeeding generations of children are swept up in the turmoil of the opioid crisis, it is also starkly clear that the cost of doing something to help them is far less than the cost of doing nothing.

Fortunately, there are solutions. The bipartisan SUPPORT Act of 2018 and the Family First Prevention Services Act both include resources and programs that policymakers and community leaders can draw upon to minimize the impact of the epidemic on children. Below is a list of 10 priority strategies* that can help children affected by opioids:

- Reduce stigma and misunderstanding of opioid use and treatment, particularly among people interacting with pregnant women and parents

- Coordinate the response across health care, law enforcement, child welfare agencies, and schools, so families struggling with substance use disorder receive a "no-wrong-door" approach to evidence-based services

- Create protocols for emergency responders to connect children on the scene of potentially traumatic events to appropriate recovery services

- Provide kinship caregivers and foster parents with tools for responding to trauma in children

- Encourage schools to practice trauma-informed care

- Research the needs of youth caregivers and develop programs to support them

- Increase the availability of family-based mental health services

- Invest in evidence-based programs for youth development

- Encourage integrated health and social services that simultaneously meet the needs of parents and children

- Reduce geographic and racial/ethnic disparities in access to services

To make these strategies work, policymakers, providers, and other stakeholders must pay closer attention to children and families affected by substance use disorders. They must also commit to a vigorous response and a new collaborative spirit to reduce harm to our nation's youth from the long-lasting consequences of the opioid epidemic.

* These strategies are described in greater detail in *The Ripple Effect: The Impact of the Opioid Epidemic on Children and Families* by Suzanne Brundage and Carol Levine.

Appendix A. Detailed state estimates for 2017 and projected state costs for 2030

State	Rate per 1,000	Total number of children affected	Residing in household with parent with OUD	Loss of parent due to death or incarceration	Removal from home for foster or kinship care	OUD as adolescent or accidental ingestion as child	Cost in 2030 ($B)
Alabama	37	42,000	27,000	3,000	9,000	3,000	7.5
Alaska	39	7,500	4,500	700	2,000	500	1.5
Arizona	31	54,000	35,500	6,000	8,000	4,500	10.0
Arkansas	30	22,000	12,500	1,500	6,000	1,500	4.0
California	20	196,000	144,500	21,500	12,500	17,500	35.5
Colorado	29	39,000	27,000	4,500	4,500	3,000	7.0
Connecticut	39	31,000	22,500	4,000	2,000	2,500	5.5
Delaware	41	9,000	6,500	1,000	400	800	1.5
District of Columbia	37	4,500	3,500	700	400	400	1.0
Florida	31	138,000	80,000	19,000	30,000	9,500	25.0
Georgia	23	60,500	38,000	6,000	11,500	4,500	11.0
Hawaii	24	8,000	5,000	600	1,500	600	1.5
Idaho	25	11,500	8,000	1,000	1,000	1,000	2.0
Illinois	21	67,500	48,000	10,500	3,000	6,000	12.0
Indiana	35	57,500	34,000	5,000	14,000	4,000	10.5
Iowa	24	18,000	11,500	1,000	4,000	1,500	3.5
Kansas	25	18,500	12,000	1,500	3,500	1,500	3.5
Kentucky	42	45,500	26,000	6,500	10,000	3,000	8.5
Louisiana	24	28,000	21,000	3,500	1,000	2,500	5.0
Maine	38	10,500	7,000	1,500	1,000	1,000	2.0
Maryland	32	47,000	32,000	8,000	3,000	4,000	8.5
Massachusetts	31	47,000	31,500	8,500	3,000	4,000	8.5
Michigan	31	71,000	49,500	9,000	6,500	6,000	13.0
Minnesota	24	32,500	22,500	2,500	4,500	2,500	6.0
Mississippi	34	25,500	13,500	1,500	9,000	1,500	4.5
Missouri	32	47,000	28,500	5,500	9,500	3,500	8.5

Appendix A. Detailed state estimates for 2017 and projected state costs for 2030 (continued)

State	Rate per 1,000	Total number of children affected	Residing in household with parent with OUD	Loss of parent due to death or incarceration	Removal from home for foster or kinship care	OUD as adolescent or accidental ingestion as child	Cost in 2030 ($B)
Montana	31	7,500	5,000	600	1,500	600	1.5
Nebraska	22	11,000	7,500	500	1,500	1,000	2.0
Nevada	27	20,000	13,000	3,500	1,500	1,500	3.5
New Hampshire	51	14,000	10,500	1,500	800	800	2.5
New Jersey	32	68,500	47,000	7,500	8,000	5,500	12.5
New Mexico	30	16,500	8,500	3,000	4,000	1,000	3.0
New York	28	125,000	90,000	13,500	10,500	11,000	22.5
North Carolina	30	71,500	46,500	8,500	11,000	5,500	13.0
North Dakota	27	4,500	3,500	200	700	400	1.0
Ohio	32	90,000	57,500	15,000	10,500	7,000	16.5
Oklahoma	30	30,500	17,000	4,000	7,500	2,000	5.5
Oregon	39	35,000	22,000	3,000	7,500	2,500	6.5
Pennsylvania	33	95,500	65,000	14,500	8,000	8,000	17.5
Rhode Island	35	8,000	5,500	1,500	600	700	1.5
South Carolina	29	33,000	22,500	3,500	4,000	2,500	6.0
South Dakota	25	5,500	4,000	300	1,000	500	1.0
Tennessee	31	50,000	32,000	6,500	7,000	4,000	9.0
Texas	23	171,000	93,000	12,500	54,000	11,000	31.0
Utah	24	23,500	15,000	3,500	3,500	2,000	4.0
Vermont	46	5,500	4,500	500	500	500	1.0
Virginia	27	52,500	37,000	6,000	5,000	4,500	9.5
Washington	34	58,000	39,500	6,500	7,500	4,500	10.5
West Virginia	54	22,000	12,000	4,000	4,500	1,500	4.0
Wisconsin	25	34,500	24,500	4,500	2,500	3,000	6.5
Wyoming	28	4,000	2,500	400	500	300	0.5

NOTE:

Figures might not add up to total due to rounding.

Appendix B. Data sources

Figure 1

Administration for Children and Families, U.S. Department of Health and Human Services. 2018. *Adoption and Foster Care Analysis and Reporting System* (2017). https://www.acf.hhs.gov/cb/research-data-technology/statistics-research/afcars

Allen J, et al. 2017. Prescription Opioid Exposures Among Children and Adolescents in the United States: 2000–2015. *Pediatrics* 139(4). DOI: 10.1542/peds.2016-3382 https://pediatrics.aappublications.org/content/139/4/e20163382.long

Biemer P and Brown G. 2005. Model-based estimation of drug use prevalence using item count data. *Journal of Official Statistics* 21(2): 287–308. https://www.ncbi.nlm.nih.gov/books/NBK519722/

Buchanich JM, et al. 2018. The Effect of Incomplete Death Certificates on Estimates of Unintentional Opioid-Related Overdose Deaths in the United States, 1999-2015. *Public Health Reports* 133(4):423-431. https://www.ncbi.nlm.nih.gov/pubmed/29945473

Bureau of Justice Statistics, U.S. Department of Justice. *Total correctional population 1980-2017.* https://www.bjs.gov/index.cfm?ty=tp&tid=11

CDC WONDER. 2019. *National Drug Overdose Deaths—Number Among All Ages, by Gender, 1999-2017.* https://wonder.cdc.gov/wonder/help/mcd.html

Clemans-Cope L, et al. 2019. Opioid and Substance Use Disorder and Receipt of Treatment Among Parents Living With Children in the United States, 2015-2017. *Annals of Family Medicine* 17 (3), 2019. http://www.annfammed.org/content/17/3/207.full

Federal Bureau of Investigation, U.S. Department of Justice. *Uniform Crime Reporting Program Data: County-Level Detailed Arrest and Offense Data, United States, 2014.* https://www.ucrdatatool.gov/index.cfm

National Institute on Drug Abuse, National Institutes of Health. 2019. *Overdose Death Rates.* https://www.drugabuse.gov/related-topics/trends-statistics/overdose-death-rates

Substance Abuse and Mental Health Services Administration. *National Survey on Drug Use and Health (NSDUH) from 2015-17.* https://www.datafiles.samhsa.gov/study-series/national-survey-drug-use-and-health-nsduh-nid13517

U.S. Census Bureau. 2019. Current Population Survey Annual Social and Economic Supplement (2009-2018). https://www.census.gov/programs-surveys/cps/data-detail.html

Figure 2

Chen Q, et al. 2019. Prevention of Prescription Opioid Misuse and Projected Overdose Deaths in the United

States. *JAMA Netw Open.* 2(2):e187621. doi:10.1001/jamanetworkopen.2018.7621

National Survey on Drug Use and Health (NSDUH) from 2015-17. (See Figure 1.)

Figure 3

American Diabetes Association. 2018. *Statistics About Diabetes.* https://www.diabetes.org/resources/statistics/statistics-about-diabetes

Centers for Disease Control and Prevention. 2019. *Data & Statistics on Autism Spectrum Disorder.* https://www.cdc.gov/ncbddd/autism/data.html

National Center for Health Statistics, Centers for Disease Control and Prevention. 2017. *Asthma.* https://www.cdc.gov/nchs/fastats/asthma.htm

Figure 4

State-level data from sources in Figure 1.

U.S. Census Bureau. 2017. *ACS Demographic and Housing Estimates. 2013-2017 American Community Survey 5-Year Estimates.* https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_17_5YR_DP05&prodType=table

Figure 5

State-level data from sources in Figure 1.

U.S. Census Bureau. 2017. *ACS Demographic and Housing Estimates. 2013-2017 American Community Survey 5-Year Estimates.* https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_17_5YR_DP05&prodType=table

Figure 6

National Survey on Drug Use and Health (NSDUH) from 2015-17; *Adoption and Foster Care Analysis and Reporting System (2017).* (See Figure 1.)

Figures 7 and 8

Centers for Disease Control and Prevention. 2019. *Smoking & Tobacco: Fast Facts.* https://www.cdc.gov/tobacco/data_statistics/fact_sheets/fast_facts/index.htm

Fang X, et al. 2012. The economic burden of child maltreatment in the United States and implications for prevention. *Child Abuse & Neglect* 36(2): 156-165. https://www.sciencedirect.com/science/article/pii/S0145213411003140#bib0095

Felitti VJ, et al. 1998. Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults. The Adverse Childhood Experiences (ACE) Study. *American Journal of Preventive Medicine* 14(4): 245-258. https://www.ncbi.nlm.nih.gov/pubmed/9635069

Florence C, et al. Health Care Costs Associated With Child Maltreatment: Impact on Medicaid. *Pediatrics* 132(2): 312-318. https://pediatrics.aappublications.org/content/132/2/312

National Institute on Drug Abuse, National Institutes of Health. 2018. *Medications to Treat Opioid Use Disorder: How Much Does Opioid Treatment Cost?* https://www.drugabuse.gov/publications/research-reports/medications-to-treat-opioid-addiction/how-much-does-opioid-treatment-cost

Peterson C, et al. 2018. The economic burden of child maltreatment in the United States, 2015. *Child Abuse & Neglect* 86: 178-185. https://www.sciencedirect.com/science/article/abs/pii/S0145213418303867

Reynolds A, et al. 2002. Age 21 Cost-Benefit Analysis of the Title I Chicago Child-Parent Centers. *Educational Evaluation and Policy Analysis* 24(4): 267-303. https://journals.sagepub.com/doi/10.3102/01623737024004267

U.S. Census Bureau. 2016. *2016 Public Elementary-Secondary Education Finance Data.* https://www.census.gov/content/census/en/data/tables/2016/econ/school-finances/secondary-education-finance.html

U.S. Surgeon General. 2016. *Facing Addiction in America: The Surgeon General's Report on Alcohol, Drugs, and Health.* https://addiction.surgeongeneral.gov/executive-summary#2

Wang C, et al. 2015. Severe Obesity In Adults Cost State Medicaid Programs Nearly $8 Billion In 2013. *Health Affairs* 34 (11). https://www.healthaffairs.org/doi/full/10.1377/hlthaff.2015.0633

Widom C and Maxfield G. 2001. An Update on the "Cycle of Violence." *National Institute of Justice: Research in Brief.* https://www.ncjrs.gov/pdffiles1/nij/184894.pdf

Winkelman T, et al. Incidence and Costs of Neonatal Abstinence Syndrome Among Infants With Medicaid: 2004-2014. *Pediatrics* 141(4): e20173520. https://pediatrics.aappublications.org/content/pediatrics/early/2018/03/21/peds.2017-3520.full.pdf

Figure 9

Same sources as Figures 2, 7, and 8.

Figure 10

Same sources as Figures 1, 7, and 8.

Appendix C. Methodology

METHODOLOGY OVERVIEW

Boston Consulting Group (BCG) constructed the following model, informed by peer-reviewed literature (key sources listed below) and expert interviews to develop the estimates in this chartbook.

BCG began by creating a "snapshot" of children under age 18 in 2017 who had been affected by the opioid epidemic. To do this, they developed estimates of the number in each of five different categories:

1. Those living with a parent with OUD

2. Those who had a parent die due to an opioid overdose ever in their lifetime

3. Those with a parent in prison due to a heroin-related offense

4. Those removed from home and living in foster care or with relatives due to household opioid use

5. Adolescents (ages 12–17) with OUD and children (ages 0–12) who accidentally ingested an opioid

These estimates were then adjusted (lowered by 30%) to remove double-counting between the categories. BCG further increased the estimates for categories 1 and 5 to reflect known undercounting in these two groups because the data is self-reported. The resulting estimates were summed across the five groups to reach the 2017 2.2 million figure.

Second, 10 types of costs associated with the different ways a child may be affected by the opioid epidemic were identified and an average cost per person calculated for each.

The average per-person costs were multiplied by the estimated number of children to whom the costs would apply (roughly aligning with the five categories listed in step 1). These costs were summed to calculate the total lifetime cost for children affected in 2017.

BCG then estimated what the total number of affected individuals would be by 2030 under three different scenarios: base, pessimistic, and optimistic.

Using the base-year case assumption for the total number of affected individuals, the average per-person cost for each of the 10 cost types was multiplied by the new projected numbers as of 2030. The sum of those numbers is the 2030 cost estimate.

To calculate the state estimates for the number of children affected in 2017, the same steps were followed, substituting state-specific data for the numbers affected. State variation in health care or other sector costs was not taken into account. The state-by-state cost projections for 2017 and 2030 were derived by using each state's percentage of the national number of children affected in 2017 and multiplying that share by the estimated national cost for the respective year.

Key academic literature:

- Biemer P and Brown G. 2005. *Model-based Estimation of Drug Use Prevalence Using Item Count Data.*

- Buchanich JM, et al. 2018. *The Effect of Incomplete Death Certificates on Estimates of Unintentional Opioid-Related Overdose Deaths in the United States, 1999-2015.*

- Chen Q, et al. 2019. *Prevention of Prescription Opioid Misuse and Projected Overdose Deaths in the United States.*

- Clemans-Cope L, et al. 2019. *Opioid and Substance Use Disorder and Receipt of Treatment Among Parents Living With Children in the United States, 2015-2017.*

- Fang X, et al. 2012. *The economic burden of child maltreatment in the United States and implications for prevention.*

- Felitti VJ, et al. 1998. *Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults. The Adverse Childhood Experiences (ACE) Study.*

DETAILED METHODOLOGY

Figure 1. Children affected by the opioid epidemic in 2017

The total figure is the sum of estimates in five categories:

1. **Children residing in a household with a parent with opioid use disorder.** A national estimate of the number of parents living with OUD was obtained from Lisa Clemans-Cope et al., and the NSDUH 2015-2017 three-year average was used. Using NSDUH 2017 state-level demographic data on the age of parents with OUD and the average number of children per age bracket, a preliminary estimate of the number of children was calculated. Using U.S. Census Bureau data, this figure was adjusted to account for household composition, taking into account the probability of households being a single-parent female-led household, a single-parent male-led household, or a two-parent household, and also considering the average number of children per household type. The estimate of the number of children residing in a household with a parent with OUD was then corrected downward to account for potential co-occurrence of OUD in two-parent households (estimated to be 15% based on expert interviews). The estimate was then adjusted upward by 30% to account for underreporting in NSDUH data (based on Biemer and Brown's *Model-based Estimation of Drug Use Prevalence Using Item Count Data* which reviewed underreporting in the NSDUH of cocaine use prevalence). Research on underreporting of self-reported opioid use suggests underreporting could be as high as 57%, so 30% is a conservative assumption.

   State-based estimates were calculated by multiplying the national estimate (1.44 million) by the state's share of national prescription-based OUD and non-prescription opioid use.

2. **Have a parent who died due to opioids.** National and state-level data on opioid overdose deaths between 1999 and 2017 were obtained from the CDC. Based on *The Effect of Incomplete Death Certificates on Estimates of Unintentional Opioid-Related Overdose*

Deaths in the United States, 1999-2015, opioid overdose deaths were corrected for underreporting on death certificates by adding a percentage of "non-specified" drug overdose deaths to the opioid-overdose deaths. The percentage of non-specified drug deaths attributed to opioids was the same percentage, at national and state-levels, of opioid-related deaths attributed to overall drug overdose deaths. By comparing the total number of adults with OUD to the number of parents with OUD in the NSDUH 2015–2017, it was estimated that 35% of overdose deaths were of parents. The number of children affected was calculated using the average fertility rate, adjusted for demographic data (age and gender) of the overdose population. The figure was corrected to exclude an estimated 40,000 children who were counted in categories 1 or 4 based on likely household composition.

3. **Have a parent who has been incarcerated due to opioids.** The current national inmate population for drug possession offenses with sentences greater than one year was obtained from the Bureau of Justice Statistics. Based on Uniform Crime Reporting statistics, an estimated 3% of these were related to heroin possession. The percentage of this population estimated to be parents, and therefore the number of children affected, was calculated using methods comparable to categories 1 and 2. To avoid potentially double-counting children who would likely appear in categories 1 or 4, only criminal sentences greater than 12 months were included in this estimate. State-level estimates were derived by applying the state share of the national correctional population to the national estimate of children who have a parent incarcerated due to opioids.

4. **Have been removed from home due to household opioid misuse.** The number of children in foster care because of parental drug use on September 30, 2017, was obtained from the 2018 Adoption and Foster Care Analysis and Reporting System (AFCARS) report using state-level data. The share of these cases with opioid involvement was estimated to be 31%, based on prevalence of opioid use compared to all substance use in NSDUH results. To account for children living in unofficial kinship care, state-level ratios of unofficial kinship care to foster care were applied, resulting in a national average ratio of six children in unofficial kinship care for every one child in foster care (2009-2018 Current Population Survey Annual Social and Economic Supplement). The figure was corrected to account for children who enter and exit foster care during the same year to avoid double-counting with category 1.

5. **Have OUD or have accidentally ingested opioids.** The number of adolescents ages 12–17 with OUD was obtained from NSDUH 2015–2017 (three-year average) and corrected for an estimated 30% in underreporting. The estimate was also corrected for double-counting with category 1 by factoring in the percentage of adolescents who sourced their opioids from relatives (30%) or who have relatives with OUD (20%). The number of children ages 0–12 hospitalized for opioid ingestion in 2015, obtained from *Prescription Opioid Exposures Among Children and Adolescents in the United States: 2000–2015*, was added to the figure.

Figure 2. Number of children affected by opioid epidemic by 2030: Three scenarios

2030 estimates were developed using a dynamic system model that simulates year-by-year changes in nonmedical opioid use in the United States. Using methods from Chen et al., *Prevention of Prescription Opioid Misuse and Projected Overdose Deaths in the US, 2019*, the model consisted of three subgroups of the population: those using prescription opioids nonmedically without an OUD; those with prescription-based OUD; and those using illicit opioids. Individuals can enter and exit the model based on changes in their opioid use. New entrants include individuals who go from misusing prescription drugs to developing a prescription-based OUD; individuals who go from misusing prescription drugs to misusing illicit opioids; and those who go directly to misusing illicit opioids. Individuals can exit the model if they stop using opioids or die from an overdose. Since the most recent data from Chen et al. was from 2015, the model was adjusted to include observed trends in prescription-based OUD and non-prescription-based OUD up to 2017.

Three future scenarios were simulated to arrive at an estimate of total new cases of OUD between 2018 and 2030.

- **Base case:** assumes prescription-based OUD incidence is decreasing based on current trends and assumes illicit OUD reached inflection point in 2016–2017.

- **Pessimistic case:** assumes prescription-based OUD is decreasing at half the rate of current trends and illicit OUD reaches an inflection point in 2020.

- **Optimistic case:** assumes prescription-based OUD is decreasing at twice the rate of current trends and illicit OUD also decreases at twice the rate of current trends.

Each of these scenarios resulted in an estimated number of new OUD cases between 2018 and 2030. Using a method similar to that used in Figure 1 and drawing upon NSDUH 2017 data, BCG calculated how many of the new OUD cases would likely be among parents and how many children they have (a weighted average fertility rate of 1.9 was used). Added to this estimate was the number of additional children born to parents with OUD in 2017 (estimated to be 146,000) and children who themselves are projected to develop an OUD between 2018 and 2030 (estimated to be 115,000).

Figure 3. Opioid epidemic's impact on children in 2017 compared to common childhood health conditions

Figure compares estimates to existing data sources. No methods to report.

Figure 4 (Rate of children affected by the opioid epidemic in 2017 by state) and Figure 5 (State rankings by rate of children affected by the opioid epidemic and total number per state in 2017)

The total number of children affected in each state is the sum of state-level estimates for Figure 1. The state rate was calculated by dividing this total by the state's under age 18 population as reported in the American Community Survey's "Demographic and Housing Estimates 2013–2017 5-year Estimates."

Figure 6. Number of children affected by the opioid epidemic in 2017 by age

Estimated age ranges for categories 1–3 were calculated using household demographic data from the NSDUH 2015–2017. These estimates: 42% of children of parents

with OUD are ages 0–5; 34% are 6–11; and 24% are 12–17. Age ranges for children in category 4 were calculated using AFCARS data. Category 5 age ranges only include children ages 12–17 with OUD, sourced from the NSDUH 2015–2017. These numbers were adjusted for underreporting and double-counting between categories, as they were in Figure 1.

Figure 7. Societal cost during childhood (based on 2.2 million children affected in 2017)

Incremental health care costs during childhood refer to the health care costs resulting from parental OUD that occurs in childhood. Costs were calculated drawing upon the work of Fang et al. 2012 and an analysis by Peterson et al. of the economic burden of child maltreatment. For this cost analysis, which used an adverse childhood experiences perspective, the effects of parental opioid use disorder on a child are assumed to be similar to the effects of child maltreatment. Child maltreatment results in additional health care costs during childhood, including additional inpatient and outpatient visits, prescription medications, and counseling. For a full list of included costs, see Florence et al., 2012. Fang et al. estimated a $33,000 incremental cost (2010 dollars) for health care received between ages 6 and 17. This estimate was adjusted to 2018 dollars using the personal consumption expenditure (PCE) price index. These costs are applied to children in categories 1–4.

NAS-related treatment costs. The source is Winkelman et al., *Incidence and Costs of Neonatal Abstinence Syndrome Among Infants With Medicaid: 2004–2014*, which found that the average Medicaid cost of hospitalizing an infant with NAS was approximately $19,000 (vs. about $4,000 without) due to longer stays post birth; this resulted in

an incremental additional birth cost of approximately $15,000. These costs apply only to children born with NAS, estimated to number 32,000 in 2017.

OUD treatment-related costs for adolescents include medication and office visits. The source for cost data is *Medications to Treat Opioid Use Disorder: How Much Does Opioid Treatment Cost?*, NIH National Institute on Drug Abuse. It assumes 75% of teenagers with OUD are treated every year from now until 2030 and an average length of treatment that is 6–8 years, with 97% of adolescents on Buprenorphine, 2% on Naltrexone, and 1% on Methadone. These costs only apply to children in category 5.

Child welfare costs. A total child welfare system cost of approximately $30 billion in 2017 (to serve 680,000 children) was used to calculate a per-child/per-year cost. This figure was multiplied by 73,000, which is the estimated number of children entering child welfare annually due to opioids. The source was AFCARS state foster care data from 2008–2017. These costs only apply to children in foster care and do not include costs of kinship care.

Special education costs. This analysis is based on literature suggesting that child maltreatment is associated with increased entry into special education systems. For this cost analysis, using an adverse childhood experiences perspective and limited additional research, it was assumed the effects of parental opioid use disorder on a child would be similar to the effects of child maltreatment. In a study examining the economic burden of child maltreatment, Fang et al. 2012 assumes a 10.5% incremental increase in special education use due to child maltreatment (24.2% of maltreated children received special education at a mean

age of 8 years, compared with 13.7% of children with no maltreatment record).

Translating this incremental increase in special education use into cost, similar to Fang et al., BCG drew upon Reynolds et al. (2002), who estimated that the average annual cost per child for special education services above and beyond regular instruction was $7,791 in 1998 dollars. This figure was adjusted upward by 4% per year to an incremental, per-year, per-pupil cost of $16,000 in 2018 dollars, based on historical education cost data. Assuming twelve years of instruction, the present value of lifetime special education costs per pupil is $186,000. Assuming a 10.5% incremental increase in special education due to parental opioid use, the per-pupil cost is estimated to be $19,511. This distributed per-child cost is applied to children in categories 1–4.

Figure 8. Long-term societal cost (based on 2.2 million children affected in 2017)

These costs were calculated on the percent likelihood of increased at-risk behavior over a lifetime (50 years) based on a blended adverse childhood experience score of 2.1 for people affected by parental substance use, the number estimated by Felitti et al. Costs do not account for productivity losses. These costs, because they take into account increased risk across a population, apply to children in categories 1–5.

Criminal justice-related costs. Cost estimate is based on the incremental effect of child maltreatment on criminal justice involvement, using methods from Fang et al., 2012, and Widom and Maxfield, 2001. Widom and Maxfield reported that child maltreatment increases the likelihood of having a juvenile arrest by 10.2 percentage

points, based on a longitudinal analysis of 1994 arrest data from a Midwestern metropolitan area. (That analysis found that 27.4% of maltreated children had a juvenile arrest compared to 17.2% of children in the comparison group.) Using the cost methods of Fang et al., BCG calculated a blended cost in 2018 dollars for juvenile and adult arrests (including expenses for arrests, treatment, probation services, and release) of $7,732, an amount that was distributed across the 2.2 million affected children.

Depression-related health care costs. The analysis assumes a 14% depression prevalence among individuals with no adverse childhood experiences and a 16 percentage-point increase above that rate among affected children (based on blended ACE scores from Felitti 1998). The cost analysis assumes one counseling session per month at a cost of $100 per session (the national average). The estimate is the lifetime cost of 50 years in present value.

Smoking-related health care costs. The analysis assumes a 7% smoking prevalence among individuals with no adverse childhood experiences and a 4 percentage-point increase above that rate among affected children (based on blended ACE scores from Felitti 1998). It also assumes an average marginal lifetime health care cost of a smoker to be $200,000 (source: CDC). The estimate is the lifetime cost of 50 years in present value.

Obesity-related health care costs. The analysis assumes a 5% obesity prevalence among individuals with no adverse childhood experiences and a 4 percentage-point increase above that rate among affected children (based on blended ACE scores from Felitti 1998). Obesity-related costs are estimated to be $1,980 per year per person in 2015 dollars. The cost was adjusted for PCE inflation. The estimate is the lifetime cost of 50 years in present value.

Increased alcohol and drug use-related health care costs.
The analysis assumes a 3% prevalence of alcohol and drug use disorders among individuals with no adverse childhood experiences and an 11 percentage-point increase above that rate among affected children (based on blended ACE scores from Felitti 1998). Blended alcohol- and drug-related costs are estimated to be $3,000 per person per year, according to a report from the U.S. Surgeon General's office. The estimate is the lifetime cost of 50 years in present value.

Figure 9. Lifetime societal cost of the opioid epidemic's impact on children in 2030

The cost was calculated by summing the totals for each cost category. The total for each cost category is the result of multiplying the per-person costs in each category by the estimated number of attributable lives in 2030. 2030 cost estimates take into account inflation and are reported as the net present value in 2018 dollars.

Figure 10. Projected societal cost of the opioid epidemic by state (based on estimated 4.3 million children affected as of 2030)

All cost estimates are based on national average cost in 2018 and do not take into account variances in health care, social service, or other sector costs. Costs are attributed to states based on their proportion of affected children in 2017. Cost estimates take into account future discounting.

EXHIBIT 184

BROOKINGS

COMMENTARY

How the opioid epidemic has affected the U.S. labor force, county-by-county

Fred Dews

September 7, 2017

In 2016, Princeton economist Alan Krueger made headlines with a shocking finding that nearly half of prime age men (or men ages 25 to 54) who are not in the labor force take pain medication on a daily basis. Two-thirds of those men—or about 2 million— take *prescription* pain medication on a daily basis.

This fall, Krueger has published a follow-up to that research, taking an even closer look at the labor force implications of the opioid epidemic on a local and national level. The new paper and data (https://www.brookings.edu/bpea-articles/where-have-all-the-workers-gone-an-inquiry-into-the-decline-of-the-u-s-labor-force-participation-rate) , published in the Fall 2017 edition of the *Brookings Papers on Economic Activity*, makes a strong case for looking at the opioid epidemic as one driver of declining labor force participation rates.

In fact, Krueger suggests that the increase in opioid prescriptions from 1999 to 2015 could account for about 43 percent of the observed decline in men's labor force participation during that same period, and 25 percent of the observed decline in women's labor force participation.

The labor force participation rate—the proportion of people employed or looking for work in the U.S.—has been declining since the early 2000s, reaching a near 40-year low of 62.4 percent in September 2015. In 2016, Italy was the only O.E.C.D. country

that had a lower labor force participation rate of prime age men than the U.S., and the participation rate of American women had fallen from the top group of O.E.C.D. countries to near the bottom.

Krueger's paper suggests that, though much of the decline can be attributed to an aging population and other trends that pre-date the Great Recession (for example, increased school enrollment of younger workers), an increase in opioid prescription rates might also play an important role in the decline, and undoubtedly compounds the problem as many people who are out of the labor force find it difficult to return to work because of reliance on pain medication.

Krueger's research indicates that regional differences in medical practices affect the share of the population taking pain medication, even controlling for the population's health and disability status. A 10 percent increase in the amount of opioids prescribed per capita in a county is associated with a 1 percent increase in the share of individuals who report taking a pain medication on any given day, holding health and other factors constant.

To understand the labor force impacts of opioid prescription rates across the U.S., Krueger linked 2015 county-level opioid prescription rates to individual-level labor force data in 1999-2001 and 2014-16.

Over the last 15 years, the labor force participation rate fell more in counties where more opioids were prescribed. Here's a county-by-county look at the relationship between the change in the labor force participation rate at the state level and the opioid prescription rate at the county level:

Combined Effect of Opioid Prescription Rates and Change in Labor Force Participation Rate
Prime Age Adults, Ages 25–54

☐ N/A

Low Opioid Prescription Rate
Small Change in Labor Force Participation Rate

High Opioid Prescription Rate
Large Decline in Labor Force Participation Rate

Note: Data on change in state-level labor force participation is from CPS years 1999-2001 and 2014-2016 for prime age adults and county-level data on opioid levels is from CDC Vital Signs (QuintilesIMS). For each county, the combined effect is the average of the percentile rank of labor force participation change and the percentile rank of opioid prescription rate.

Based on data used in "Where Have All the Workers Gone? An Inquiry into the Decline of the U.S. Labor Force Participation Rate" by Alan Krueger. Brookings Papers on Economic Activity, Fall 2017

B | **Economic Studies** at BROOKINGS

Krueger notes that, "Regardless of the direction of causality, the opioid crisis and depressed labor force participation are now intertwined in many parts of the U.S." He argues that finding a solution to the decades-long slide in labor force participation by prime-age men should be "a national priority." Men who are outside the workforce, he writes, express very low levels of subjective well-being and report deriving relatively little meaning from their daily activities.

Krueger concludes:

> Because nearly half of this group [men who are out of the labor force] reported being in poor health, it may be possible for expanded health insurance coverage and preventative care under the Affordable Care Act to positively affect the health of prime age men going forward. The finding that nearly half of NLF [not in the labor force] prime age men take pain medication on a daily basis and that 40 percent report that pain prevents

them from accepting a job suggests that pain management interventions could potentially be helpful.

To learn more, read the full paper and download the data by Alan Krueger (https://www.brookings.edu/bpea-articles/where-have-all-the-workers-gone-an-inquiry-into-the-decline-of-the-u-s-labor-force-participation-rate) from the Fall 2017 edition of the *Brookings Papers on Economic Activity*.

Krueger's paper is one of five new papers published in the Fall 2017 edition. Browse the edition (https://www.brookings.edu/product/brookings-papers-on-economic-activity-fall-2017-edition/) to read more about all the new findings in economics.

Correction: This post was updated on January 9, 2019 to correct an error with the author's calculations which inaccurately attributed 20 percent of the decline in US male labor force participation from 1999 to 2015 to the increase in opioid prescriptions. The rise in opioid prescriptions could account for as much as 43 percent in the decline in male labor force participation during this time period.

AUTHOR

Fred Dews **Managing Editor, New Digital Products** - Office of Communications ✕ @publichistory

EXHIBIT 185

Where Have All the Workers Gone? An Inquiry into the Decline of the U.S. Labor Force Participation Rate

ALAN B. KRUEGER
Princeton University

Where Have All the Workers Gone? An Inquiry into the Decline of the U.S. Labor Force Participation Rate

ABSTRACT   The U.S. labor force participation rate has declined since 2007, primarily because of population aging and ongoing trends that preceded the Great Recession. The labor force participation rate has evolved differently, and for different reasons, across demographic groups. A rise in school enrollment has largely offset declining labor force participation for young workers since the 1990s. Labor force participation has been declining for prime age men for decades, and about half of prime age men who are not in the labor force may have a serious health condition that is a barrier to working. Nearly half of prime age men who are not in the labor force take pain medication on any given day; and in nearly two-thirds of these cases, they take prescription pain medication. Labor force participation has fallen more in U.S. counties where relatively more opioid pain medication is prescribed, causing the problem of depressed labor force participation and the opioid crisis to become intertwined. The labor force participation rate has stopped rising for cohorts of women born after 1960. Prime age men who are out of the labor force report that they experience notably low levels of emotional well-being throughout their days, and that they derive relatively little meaning from their daily activities. Employed women and women not in the labor force, by contrast, report similar levels of subjective well-being; but women not in the labor force who cite a reason other than "home responsibilities" as their main reason report notably low levels of emotional well-being. During the past decade, retirements have increased by about the same amount as aggregate labor force participation has
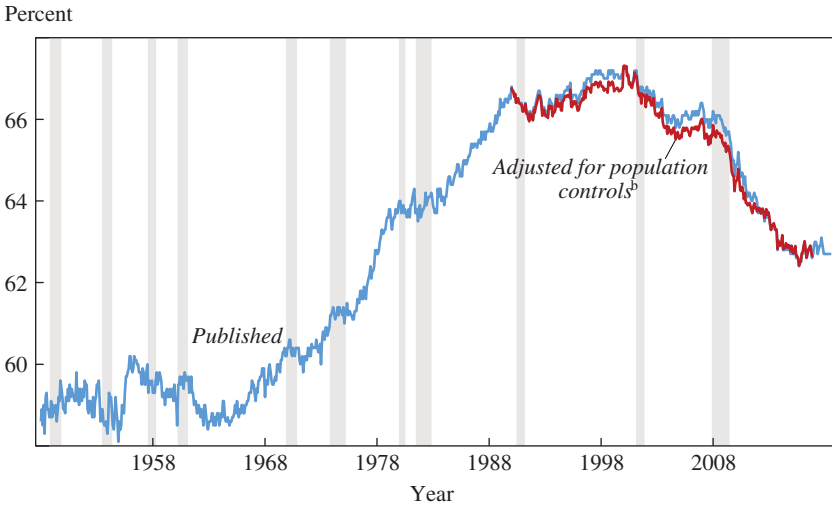
declined, and the retirement rate is expected to continue to rise. A meaningful rise in labor force participation will require a reversal in the secular trends affecting various demographic groups, and perhaps immigration reform.

T he labor force participation rate in the United States peaked at 67.3 percent in early 2000, and has declined at a more or less continuous pace since then, reaching a near 40-year low of 62.4 percent in September 2015 (figure 1). Italy was the only other country in the Organization for Economic Cooperation and Development that had a lower labor force participation rate for prime age men than the United States in 2016. Although the labor force participation rate has stabilized since the end of 2015, evidence on labor market flows—in particular, the continued decline in the rate of transition for those who are out of the labor force back into the labor force—suggests that this is likely to be a short-lived phenomenon. This paper examines secular trends in labor force participation, with a particular focus on the role of pain and pain medication in the lives of prime age men who are not in the labor force (NLF) and prime age women who are NLF *and* who do not cite "home responsibilities" as the main reason for not working, because these groups express the greatest degree of distress and dissatisfaction with their lives.

The paper is organized as follows. The next section summarizes evidence on trends in labor force participation overall and for various demographic groups. The main finding of this analysis is that shifting demographic shares, mainly an increase in older workers, and trends that preceded the Great Recession (for example, a secular decline in the labor force participation of prime age men) can account for the lion's share of the decline in the labor force participation rate since the last business cycle peak.

Because most of the movement in the labor force participation rate in the last decade reflects secular trends and shifting population shares, section II examines trends in the participation rate separately for young workers, prime age men, and women, as well as the retirement rate. The role of physical and mental health limitations, which could pose a barrier to employment for about half of prime age, NLF men, is highlighted and explored. Survey evidence indicates that almost half of prime age, NLF men take pain medication on any given day, and that as a group prime age men who are out of the labor force spend over half their time feeling some pain. A follow-up survey finds that 40 percent of prime age, NLF men report that pain prevents them from working at a full-time job for which they are qualified, and that nearly two-thirds of the men who take

Figure 1. The U.S. Labor Force Participation Rate, 1948–2017[a]

Percent

Sources: U.S. Bureau of Labor Statistics; National Bureau of Economic Research; author's calculations.
a. Shading denotes recessions. The data are seasonally adjusted.
b. Data for 1990 to 2016 have been adjusted to account for the effects of the annual population control adjustments to the Current Population Survey.

pain medication report taking prescription medication. It is also shown that generational increases in labor force participation that have historically raised women's labor force participation over time have come to an end, so the United States can no longer count on succeeding cohorts of women to participate in the labor market at higher levels than the cohorts they are succeeding. This section also documents that an increase in the retirement rate since 2007 accounts for virtually all the decline in labor force participation since then, suggesting the persistence of labor force exits.

Section III presents evidence on the subjective well-being of employed workers, unemployed workers, and those who are out of the labor force, by demographic group. Two measures of subjective well-being are used: an evaluative measure of life in general, and a measure of reported emotional experience throughout the day. Young labor force nonparticipants seem remarkably content with their lives, and report relatively high levels of affect during their daily routines. Prime age, NLF men, however, report less happiness and more sadness during their days than do unemployed men, although they evaluate their lives in general more highly than unemployed
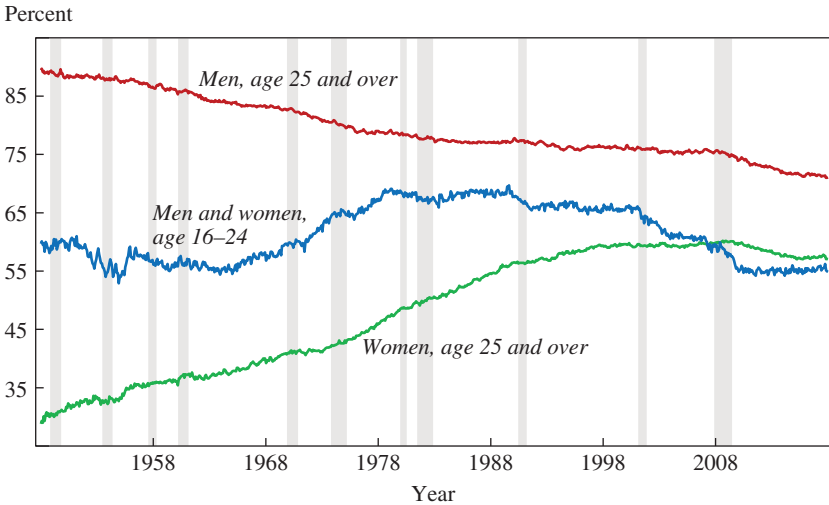
men. Prime age and older NLF women report emotional well-being and life evaluations in general that are about on par with employed women of the same age, suggesting a degree of contentment that may make it unlikely that many in this group rejoin the labor force.

Given the high use of pain medication by prime age, NLF men and women, and the mushrooming opioid crisis in the United States since the early 2000s, section IV provides an analysis of the connection between the use of pain medication, opioid prescription rates, and labor force participation. Evidence is first presented indicating that pain medication is more widely used in areas where health care professionals prescribe more opioid medication, holding constant individuals' disability status, self-reported health, and demographic characteristics. Next, regression analysis finds that labor force participation fell more in counties where more opioids were prescribed, controlling for the area's share of manufacturing employment and individual characteristics. Although it is unclear whether these correlations represent causal effects, these findings reinforce concerns from anecdotal evidence. For example, in his memoir *Hillbilly Elegy*, J. D. Vance (2016, p. 18) writes about a recent visit with his second cousin, Rick, in Jackson, Kentucky: "We talked about how things had changed. 'Drugs have come in,' Rick told me. 'And nobody's interested in holding down a job.'" And the findings complement Anne Case and Angus Deaton's (2017, p. 438) conclusion that "deaths of despair" for non-Hispanic whites "move in tandem with other social dysfunctions, including the decline of marriage, social isolation, and detachment from the labor force."

The conclusion highlights the role of physical, mental, and emotional health challenges as a barrier to working for many prime age men and women who are out of the labor force. Because—apart from the unemployed—this group exhibits the lowest level of emotional well-being and life evaluation, there are potentially large gains to be had by identifying and implementing successful interventions to help prime age, NLF men and women lead more productive and fulfilling lives.

I. Trends in Participation

Figure 1 shows the seasonally adjusted labor force participation rate as published by the U.S. Bureau of Labor Statistics (BLS). In addition, the figure shows alternative estimates of the participation rate using labor force and population data that were smoothed to adjust for the introduction of the 2000 and 2010 decennial U.S. Census population controls in the Current Population Survey (CPS) in 2003 and 2012, respectively, and intercensal

Figure 2. Labor Force Participation Rates by Age and Gender, 1948–2017[a]

Percent

Sources: U.S. Bureau of Labor Statistics; National Bureau of Economic Research.
a. Shading denotes recessions. The data are seasonally adjusted.

population adjustments introduced in January of each year.[1] These population adjustments undoubtedly occurred more gradually over preceding months and years. Compared with the published series, the adjusted series indicates that the labor force participation rate rose a bit less during the 1990s recovery, declined a bit more during the 2001–07 recovery, and has fallen a bit less during the current recovery; but overall the trends are similar. Henceforth, I focus on the adjusted labor force data.

The aggregate labor force participation rate series masks several disparate trends for subgroups. Figure 2 shows the participation rate separately for men age 25 and older, women age 25 and older, and young people age 16–24. The online appendix figures show participation rate trends further disaggregated by age and sex.[2] As is well known, the participation

1. The population controls introduced in 2012, for example, caused an abrupt drop of 0.3 percentage point in the labor force participation rate from December 2011 to January 2012, largely because the population of older individuals exceeded the figure that had been assumed in intercensal years. I closely follow the procedures outlined at http://www.bls.gov/cps/documentation.htm#pop to smooth out changes in population controls.

2. The online appendixes for this and all other papers in this volume may be found at the *Brookings Papers* web page, www.brookings.edu/bpea, under "Past BPEA Editions."

rate for adult men has been on a downward trajectory since the BLS began collecting labor force data in 1948. This trend has been a bit steeper since the late 1990s, but the decline in participation of prime age men in the labor force is not a new development and was not sharper after the Great Recession than it was before it (see figures A4–A6 in the online appendix).[3] Workers age 55 and older are the only age group that has shown a notable rise in participation over the last two decades, albeit from a low base for the 65 and older age group, and the long-running rise in participation for women age 55–64 seems to have come to an end since the Great Recession.

The aggregate labor force participation rate rose in the half century following World War II because women increasingly joined the labor force.[4] Beginning in the late 1990s, however, the labor force participation rate of women age 25 and over unexpectedly reached a decade-long plateau, and since 2007 women's labor force participation has edged down, almost in parallel with men's. The plateau and then decline in women's labor force participation are responsible for the downward trajectory of the aggregate U.S. labor force participation rate. Although age, cohort, and time effects cannot be separately identified, I show below that this appears more consistent with cohort developments than time effects.

Finally, younger workers have exhibited episodic declines in labor force participation since the end of the 1970s. After falling sharply toward the end of the Great Recession, the labor force participation rate for younger individuals has stabilized since then. The labor force participation rate of young workers probably responds more to the state of the business cycle than that of older workers because school is an alternative to work for many young workers in the short run.
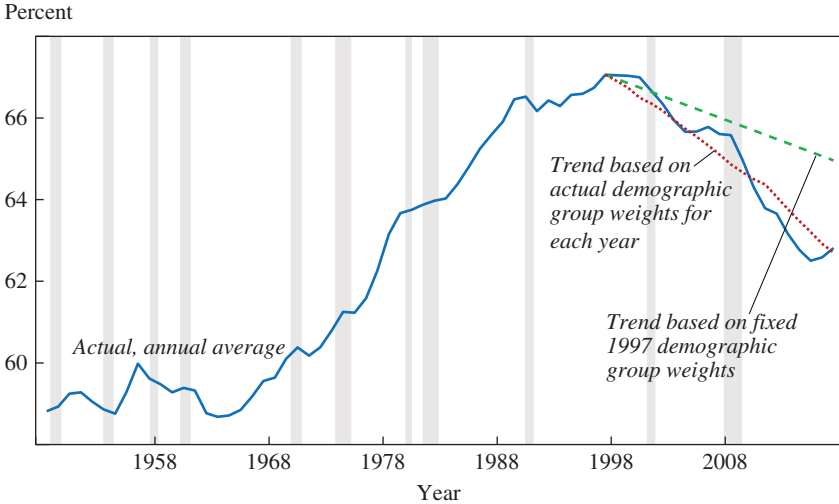
I.A. Decomposing the Decline in the Labor Force Participation Rate

At an annual frequency, the labor force participation rate reached a peak in 1997 (figure 3). From 1997 to the first half of 2017, the aggregate participation rate fell by 4.2 percentage points, with most of the decline (2.8 points) occurring after 2007.[5] Several studies have found that shifting

---

3. Charles, Hurst, and Notowidigdo (2016, forthcoming) provide evidence that the housing boom in the prerecession period masked an even greater fall in the labor force participation of less-educated, prime age men from 2000 to 2006 due to the collapse of manufacturing.

4. See Goldin (1991) for an analysis of women's post–World War II labor supply.

5. Data for 2017 are only available for the first six months of the year, as of this writing. Because the aggregate labor force participation rate historically is not very different over the first six months and full year, I do not make an adjustment for seasonality here.

Figure 3. Labor Force Participation Rate, 1948–2017[a]

Percent

Trend based on actual demographic group weights for each year

Actual, annual average

Trend based on fixed 1997 demographic group weights

Year

Sources: U.S. Bureau of Labor Statistics; National Bureau of Economic Research; author's calculations.

a. Shading denotes recessions. The data are not seasonally adjusted, annual averages. The 2017 data point is the average of data from January through June. Data for 1990 to 2016 have been adjusted to account for the effects of the annual population control adjustments to the Current Population Survey.

demographics, mainly toward an older population, are responsible for about half the decline in labor force participation.[6]

To see the effects of shifting demographics, we can write the aggregate labor force participation rate in year t, denoted ℓ_t, as

(1) $$\ell_t = \sum_i \ell_{it}\left(\frac{p_{it}}{\sum_i p_{it}}\right) = \sum_i \ell_{it} w_{it},$$

where ℓ_{it} is the labor force participation rate for group i in year t, p_{it} is the size of the population of group i in year t, and w_{it} is the population share of group i in year t.

6. See CEA (2014) for an excellent survey of the literature. Fernald and others (2017) further expand the shift-share analysis by disaggregating cells by education, race, and marital status. They find that from 2010 to 2016, two-thirds of the decline in labor force participation occurred within groups, and one-third was due to the shift across groups. However, it is possible that membership in some of the categories, such as marital status, is endogenously determined.

The change between year $t - k$ and year t can be written as

$$(2) \quad \Delta\ell = \sum \Delta\ell_{it} w_{it-k} + \sum \Delta w_i \ell_{it} \quad \text{and} \quad \Delta\ell = \sum \Delta\ell_{it} w_{it} + \sum \Delta w_i \ell_{it-k},$$

or, a component due to the change in rates within groups (weighted by starting or ending period population shares), and a component due to changes in population shares (weighted by ending or starting period participation rates).

Table 1 reports the labor force participation rate and population shares for 16 age-by-sex groups.[7] There are notable declines in the labor force participation rate for young workers, both male and female. The population shares have also shifted over time; the share of the population age 55 and over rose from 26.3 to 35.6 percent from 1997 to 2017, while the share for age 25–54 fell from 57.5 to 49.3 percent. The table's bottom two rows report $\sum \ell_{it} w_{it}$, where the population weights are for either 1997 or 2017. In general, the population has shifted toward groups with lower labor force participation rates, and this accounts for well over half the decline in the labor force participation rate. Using the decompositions in equation 2, the shift in the population shares can account for 65 percent [= (65.6 – 62.8)/ (67.1 – 62.8)] or 88 percent [= (67.1 – 63.3)/(67.1 – 62.8)] of the decline in labor force participation from 1997 to 2017, depending on whether 1997 or 2017 population shares are used to weight changes in each group's participation rate. Clearly, the changing age distribution of the population has had a major influence on the labor force participation rate. However, the decline in the labor force participation rate of young workers, especially young men, is also quantitatively important. Regardless of which year's population shares are used as weights, the decline in labor force participation of young men (age 16–24) from 1997 to 2017 accounts for almost one quarter of the decline in the overall labor force participation rate, or about triple their current share of the population.

A limitation of these decompositions is that there is no counterfactual comparison and no other factors are considered, apart from demographics. Furthermore, changing population shares could affect the labor force participation of different groups. These calculations are just accounting identities that highlight the potential magnitudes of various shifts in population groups.

---

7. I use annual data because seasonally adjusted, smoothed population controls are not available for each group. Data for 2016 are the average of the first eight months of the year. In earlier years, the average of the first eight months of the year was close to the annual average, so no adjustment is made for seasonality.

Table 1. Labor Force Participation Rates and Population Shares for Selected Demographic Groups, 1997–2017[a]

Demographic group	Labor force participation rate (percent)			Population share (percent)		
	1997	2007	2017, first half	1997	2007	2017, first half
Total	67.1	65.6	62.8	100.0	100.0	100.0
Men						
Age 16–17	41.3	28.7	22.9	2.0	2.1	1.8
Age 18–19	63.9	55.2	47.5	1.9	1.8	1.6
Age 20–24	82.5	78.5	73.6	4.3	4.5	4.2
Age 25–34	92.9	92.2	88.9	9.6	8.2	8.5
Age 35–44	92.5	92.2	90.8	10.7	8.8	7.7
Age 45–54	89.4	88.2	86.2	8.0	9.1	8.1
Age 55–64	67.6	69.6	70.4	5.1	6.8	7.9
Age 65 and over	17.1	20.5	23.9	6.6	6.9	8.6
Women						
Age 16–17	41.0	30.7	24.8	1.9	2.0	1.8
Age 18–19	61.2	53.7	47.5	1.8	1.7	1.5
Age 20–24	72.6	70.0	68.2	4.3	4.4	4.2
Age 25–34	76.0	74.4	75.3	9.9	8.5	8.7
Age 35–44	77.7	75.5	74.8	10.9	9.2	8.0
Age 45–54	76.0	76.0	74.4	8.4	9.6	8.4
Age 55–64	50.9	58.3	58.9	5.5	7.4	8.5
Age 65 and over	8.6	12.6	15.8	9.1	9.1	10.7
Aggregate of demographic groups						
$\sum_i \ell_{i,t} \times w_{i,1997}$	67.1	66.5	65.6			
$\sum_i \ell_{i,t} \times w_{i,2017}$	63.3	63.4	62.8			

Sources: U.S. Bureau of Labor Statistics; author's calculations.

a. Data are not seasonally adjusted, annual averages. The 2017 data are averages of data from January through June. Data for 1990 to 2016 have been adjusted to account for the effects of the annual population control adjustments to the Current Population Survey.

I.B. *Continuation of Past Trends?*

As mentioned above, the decline in the labor force participation rate was faster in the last decade than in the preceding one. I next examine the extent to which the decline of 2.8 percentage points in the labor force participation rate since the start of the Great Recession represents a continuation of past trends that were already in motion, combined with shifts in population shares, or is a new development. Specifically, for each of the 16 groups listed in table 1, I estimated a linear trend from 1997 to 2006 by ordinary

least squares.[8] This 10-year period was chosen because it encompasses the pre–Great Recession downward trend in labor force participation.[9] I then extrapolate from the past decade's trend over the next decade. To the extent that secular trends were affecting participation trends for various groups before the Great Recession (for example, education rising for some groups, and in turn affecting the trend in the labor force participation rate), this approach would reflect those developments. The online appendix figures show the trends for each subgroup, where the intercept has been adjusted so the fitted line matches the actual labor force participation rate in 1997.

The group with the biggest negative forecast residual compared with the previous decade's trend is women age 55–64, who were predicted to experience a rise of 9 percentage points in their participation rate but actually experienced little change from 2007 to 2017 (see table 1 and online appendix figure A15). In general, there was a form of mean reversion, with the groups with the sharpest downward (or upward) trends from 1997 to 2006 experiencing more moderate downward (or upward) trends in the ensuing decade.

The dashed line in figure 3 aggregates across the group-specific trends using *fixed* 1997 population shares for each year. The dotted line uses the actual population shares for each year to weight the group's predicted labor force participation rate to derive an aggregate rate.[10] The difference between the dashed and the dotted lines highlights the importance of shifting population shares. The labor force participation rate was almost 1 percentage point below its predicted level in 2015, which is probably a cyclical effect of the Great Recession; but this gap closed by 2017.

Figure 3 makes clear that the lion's share of the decline in labor force participation since the start of the Great Recession is consistent with a continuation of past trends and shifting population shares. Extrapolating from the 1997–2006 trends for each group, and weighting by 1997 population shares, leads to a forecast that the labor force participation rate would have

---

8. Although tables 2 and 3 suggest a quadratic trend fits the aggregate data better than a linear one, in 7 of the 16 subgroups, the quadratic term is insignificant in the period 1997–2016, and a linear trend does not do much injustice for describing the data for the other groups. Over such a short period, the linear extrapolation could be thought of as a first-order approximation to a more complicated trend.

9. If a 7-year sample period is used, the results are similar; and if a 15-year period is used, the trends are mostly flat.

10. Formally, the predicted participation rate is the weighted sum of each group's predicted labor force participation rate based on the linear trend for that group, where the weights are the group's actual share of the population in the year: $\hat{\ell}_t = \Sigma \hat{\ell}_{it} w_{it}$, where $\hat{\ell}_{it}$ is based on an extrapolation from the ordinary least squares estimated linear trend.

fallen by about 1 percentage point from 2007 to 2017 as a result of pre-existing trends, or about 40 percent of the actual decline. Shifting population demographics can account for almost all the remaining gap.

I.C. How Much of a Cyclical Recovery Should Be Expected?

A key question for economic policymakers is the extent to which labor force participation can recover from its two-decades-long decline. As emphasized so far, most of the decline in the participation rate since 2007 is the (anticipated) result of an aging population *and* group-specific participation trends that were in motion before the Great Recession.[11] These trends could strengthen or reverse, but an aging workforce is likely to put downward pressure on labor force participation for the next two decades. To the extent that there was a cyclical negative shock to participation, however, one might expect some recovery in the near term.
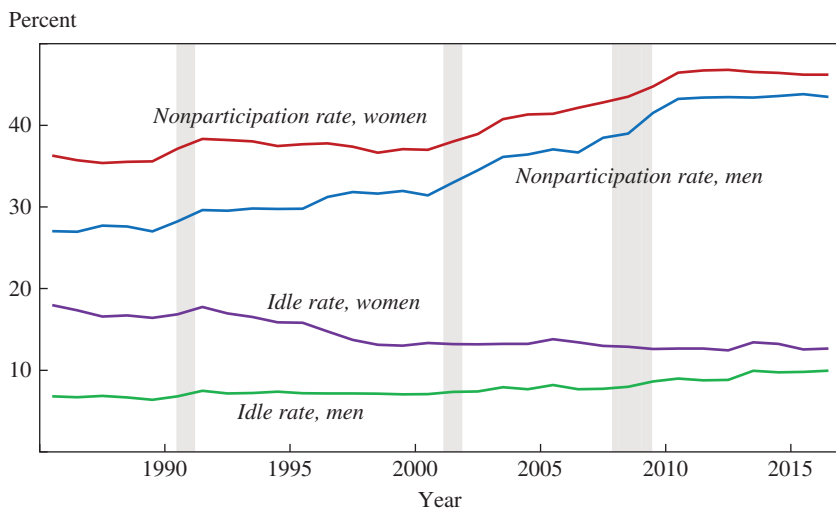
The rise of 0.6 percentage point in the (seasonally adjusted) labor force participation rate from September 2015 to March 2016 gave some hope that a cyclical recovery might be taking place. However, three considerations suggest that there will be only a limited and short-lived cyclical recovery in labor force participation. First, John Fernald and others (2017) find that by 2016, the cyclical component of the fall in labor force participation had essentially dissipated, regardless of the lag structure. Second, the seasonally adjusted labor force participation rate has displayed no trend since March 2016, suggesting that the cyclical recovery may already be over, consistent with Fernald and others' (2017) conclusion.

Third, the likelihood of transitioning into the labor force from out of the labor force edged down throughout the recovery, including in late 2015 and early 2016, when the labor force participation rate retracted 0.6 percentage point. Moreover, historically, there has been no tendency for the rate of transitions from out of the labor force into the labor force to behave cyclically (Krueger, Cramer, and Cho 2014).

Given the preexisting downward trend in labor force participation for most demographic groups and the aging of the U.S. population, stabilization in the labor force participation rate for a time may represent the best one could expect for a cyclical recovery. If a cyclical recovery in labor force participation is unlikely, then a reversal of secular trends toward a declining labor force is the only way to achieve an increase in labor

---

11. The CEA (2007; table 1-2 and box 1-2), for example, predicted an annual decline of 0.2 to 0.3 percentage point in the labor force participation rate from 2007 to 2012 because of the aging of the baby boom cohort. See also Aaronson and others (2006, 2014).

Figure 4. Labor Force Nonparticipation and Idle Rates by Gender for Age 16–24, 1985–2016[a]

Sources: U.S. Bureau of Labor Statistics; National Bureau of Economic Research.
a. Shading denotes recessions. The data are not seasonally adjusted, annual averages. "Idle" refers to persons who are neither enrolled in school nor participating in the labor force.

force participation. The next section focuses on secular trends toward non-participation for key demographic groups.

II. Secular Trends for Specific Groups

Given that most of the changes in the the labor force participation rate in the last decade reflect secular trends and shifting population shares, in this section I examine trends in participation for various demographic groups.

II.A. Young Workers

Young people have exhibited the largest decline in labor force participation in the past two decades. To a considerable extent, however, this has been offset by their increased school enrollment. Figure 4 displays trends in the nonparticipation rate separately for young men and women age 16–24 from 1985 to 2016. The share of young workers who were neither employed nor looking for a job increased significantly from 1994 to 2016. In 1994, 29.7 percent of young men were not participating in the labor force, and in 2016 this share was 43.0 percent.

Nonparticipation in the labor force also rose for young women. However, if we remove individuals who were enrolled in school in the survey reference week, the story is quite different. The bottom two lines of figure 4 show the percentage of men and women in this age group who were idle, defined as neither enrolled in school nor participating in the labor force. Young men still display an upward trend, but the share who were idle only rose from 7.4 to 9.9 percent from 1994 to 2016, while the trend for women is downward (from 15.9 to 12.7 percent over the same period).

A rise in school enrollment has therefore helped to offset much of the decline in participation. Given the significant increase in the monetary return to education that began in the early 1980s, this development could be viewed as a delayed and overdue reaction to economic incentives.

WORKING AGE YOUNG MEN Mark Aguiar and others (2017) highlight the rise in nonwork and nonschool time by young men age 21–30, especially those with less than a college education. The share of non–college educated young men who did not work at all over the entire year rose from 10 percent in 1994 to more than 20 percent in 2015. Aguiar and others (2017) propose the intriguing hypothesis that the improvement in video game technology raised the utility from leisure for young men, contributing to a downward shift in labor supply and a more elastic response to wages.[12] Although Aguiar and others (2017) are clear to point out that demand-side factors may also have contributed to the decline in the work hours of young men, and that their estimates of the shift in the labor supply curve due to changes in leisure technology for video and computer games only account for 20 to 45 percent of the observed decline in market work hours of less educated young men, their hypothesis has generated keen interest. Here I briefly examine their video game hypothesis by comparing the self-reported emotional experience during video game playing, television watching, and all activities, as well as more standard labor force, school enrollment, and time use data.

Preliminarily, the CPS data indicate that from October 1994 to October 2014, the labor force participation rate of men age 21–30 fell by 7.6 percentage points, from 89.9 to 82.3 percent, and this decline was partially offset by an increase in school enrollment. Idleness—defined as not being enrolled in school, employed, or looking for work—rose by 3.5 percentage points over this period.

12. Technically, their time use measure pertains to all game playing. I follow their precedent of referring to the game playing activity in the American Time Use Survey as *video* game playing, as the increase in time devoted to this activity is most likely overwhelmingly the result of video game playing.

Table 2. The Average Number of Hours Spent per Week on Activities by Men Age 21–30, 2004–15[a]

Activity	2004–07	2008–11	2012–15	Change from 2004–07 to 2012–15
Sleeping	60.84	60.76	61.64	0.80
Work (including commuting)	37.10	36.05	33.77	–3.33
Watching TV	17.20	16.71	17.00	–0.20
Eating and drinking	7.42	7.48	7.39	–0.03
Grooming	3.91	4.07	4.06	0.14
Socializing	4.66	4.71	5.16	0.50
Food and drink preparation	1.33	1.69	1.94	0.61
Cleaning	1.22	1.32	1.08	–0.13
Reading	0.85	0.74	0.95	0.10
Shopping	2.04	1.85	1.80	–0.24
Laundry	0.40	0.45	0.56	0.16
Relaxing or thinking	1.44	1.38	1.51	0.07
Gardening	0.67	0.73	0.75	0.08
Child care	1.92	2.13	1.83	–0.09
Education	3.35	3.80	4.74	1.39
Adult care	0.12	0.12	0.13	0.01
Computer use	1.25	1.56	1.86	0.60
Playing games	2.05	3.28	3.72	1.67
No. of observations	2,705	2,638	2,308	

Source: U.S. Bureau of Labor Statistics, American Time Use Survey.

a. The data are weighted using final weights, and include respondents who reported no time spent on an activity.

Table 2 reports the amount of time that men age 21–30 spent engaged in various activities per week in 2004–07, 2008–11, and 2012–15.[13] Market work hours declined by 3.3 hours per week (9 percent) from 2004–07 to 2012–15. Increases in time devoted to education (1.4 hours), playing games (1.7 hours), and computers (0.6 hour) over this period more than offset the decline in the time spent working. If we limit the sample to young, NLF men (not shown), the time spent on education increased by an impressive 5.9 hours, or 40 percent. The time devoted to education activities edged up 0.2 hour per week for young, NLF men with a high school education or less; but conditioning on low education would downwardly bias any increase in school enrollment in this age group over time. The time spent playing video games by young, NLF men rose from 3.6 hours per week in

13. The total amount of time per week spent in the listed activities does not add up to 168 hours because some categories, such as travel, are omitted.

2004–07 to 6.7 hours per week in 2012–15, while the time spent watching television fell from 23.7 to 21.8 hours over this period. As Aguiar and others (2017) conclude, video game playing is clearly drawing more attention from this group over time.

The American Time Use Survey (ATUS) for 2010, 2012, and 2013 included a supplement on subjective well-being modeled on the Princeton Affect and Time Survey (Krueger and others 2009). Specifically, for three randomly selected episodes each day, respondents were asked to report—on a scale from 0 to 6, where a 0 means they did not experience the feeling at all and a 6 means the feeling was very strong—how happy, sad, tired, and stressed they felt at that time. In addition, they were asked how much pain, if any, they felt at that time, and how "meaningful" they considered what they were doing. Because television is a leisure activity that is probably a close substitute for video games, I explore the self-reported emotional experience during the time spent playing video games and watching TV, and during all activities for young men.

If video game technology did indeed improve sufficiently to make engaging in the activity more enjoyable, one would expect to see better emotional states (for example, a higher rating of happiness) during the time spent playing video games than during the time spent watching TV. Moreover, with three observations per person, it is possible to control for individual fixed effects and compare young men's reported experiences as they engage in different activities throughout the day. Table 3 shows estimates of fixed effects regressions of the various affect measures on a dummy indicating the time spent playing games, watching television, and using a computer. The omitted group is all other activities. To increase the sample size, the sample consists of men age 16–35. The results show some evidence that episodes that involve game playing are associated with greater happiness, less sadness, and less fatigue than episodes of TV watching, although stress is higher during game playing. Game playing also appears to be a more pleasant experience than using the computer for this group. Game playing, however, is not reported as a particularly mean-ingful activity by participants; indeed, it is reported as less meaningful than other activities.

The ATUS also reveals that game playing is a social activity. For a little over half the time that young men play video games, they report that they were with someone while engaging in the activity, most commonly a friend. Furthermore, during 70 percent of the time that they were playing games, they report they were interacting with someone (presumably online when they were not present). As a whole, these findings suggest that it is possible

Table 3. Regressions of Various Affect Measures on Activity Indicators for Men Age 16–35[a]

	Affect measure					
	Happiness (1)	Sadness (2)	Stress (3)	Tiredness (4)	Pain (5)	Meaning (6)
Constant	4.177***	0.512***	1.526***	2.277***	0.601***	4.226***
	(0.021)	(0.021)	(0.022)	(0.025)	(0.016)	(0.029)
Gaming indicator	0.549***	–0.198**	–0.240**	–0.180	–0.022	–0.695***
	(0.109)	(0.086)	(0.119)	(0.209)	(0.047)	(0.256)
TV indicator	0.082	–0.151*	–0.676***	0.507***	–0.079	–0.938***
	(0.072)	(0.092)	(0.090)	(0.088)	(0.056)	(0.095)
Computer indicator	–0.323	–0.004	–0.342*	0.090	–0.352	–0.947***
	(0.203)	(0.077)	(0.187)	(0.192)	(0.214)	(0.266)
Person fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	12,603	12,618	12,621	12,618	12,621	12,594
Test of equality of indicator variables						
p value for gaming = TV	0.000	0.662	0.002	0.002	0.340	0.343
p value for gaming = computer	0.000	0.081	0.633	0.323	0.113	0.468

Sources: U.S. Bureau of Labor Statistics, American Time Use Survey, Well-Being Module; author's calculations.

a. The sample is pooled over 2010, 2012, and 2013 for men age 16–35. The regressions are weighted using the Well-Being Module's adjusted pooled activity weights. Standard errors are in parentheses. Statistical significance is indicated at the ***1 percent, **5 percent, and *10 percent levels.

that, as Aguiar and others (2017) argue, improvements in video games have increased the enjoyment young men derive from leisure in a consequential way.

II.B. Prime Age Men

Although the labor force participation rate of prime age men has trended down in the United States and other economically advanced countries for many decades, by international standards the labor force participation rate of prime age men in the United States is notably low. Because prime age men have the highest labor force participation rate of any demographic group, and have traditionally been the main breadwinners for their families, much attention has been devoted to the decline in participation of prime age men in the United States.[14] Evidence given by Chinhui Juhn, Kevin Murphy, and Robert Topel (1991, 2002) and by Katharine Abraham and Melissa Kearney (2018) suggests that the secular decline in real wages of less skilled workers is a major contributor to the secular decline in their labor force participation rates. The Council of Economic Advisers (CEA 2016) reaches a similar conclusion, because the decline in labor force participation has been steeper for less educated prime age men. Figure 5 shows that the labor force participation rate of prime age men fell at all education levels, but by substantially more for those with a high school degree or less.
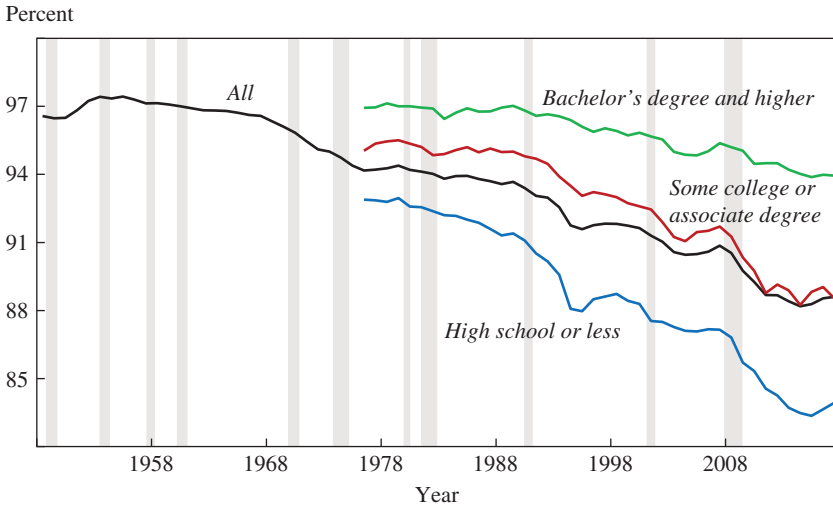
Here I highlight a significant supply-side barrier to the employment prospects of prime age men, namely, health-related problems.[15] Table 4 reports the distribution of men and women reporting their health as excellent, very good, good, fair, or poor, based on the 2010, 2012, and 2013 ATUS Well-Being Module (ATUS-WB).[16] Forty-three percent of prime age, NLF men reported their health as fair or poor, compared with just 12 percent of employed men and 16 percent of unemployed men. NLF women are also more likely to report being in only fair or poor health compared with employed women, but the gap is smaller—31 versus 11 percent. Thus, health appears to be a more significant issue for prime age men's participation in the labor force than for prime age women's, so in this section I focus

---

14. Eberstadt (2016), for example, calls the increase in jobless men who are not looking for work "America's invisible crisis."

15. Coglianese (2016) finds that about half the decline in labor force participation for prime age men is due to permanent exits, and that only 20 to 30 percent of the decline is due to reduced labor demand, suggesting a major role for supply-side factors.

16. The exact question is: "Would you say your health in general is excellent, very good, good, fair, or poor?" Self-reported subjective health questions have been found to correlate reasonably well with objective health outcomes in the past.

Figure 5. The Labor Force Participation Rate for Men Age 25–54 by Educational Attainment, 1948–2017[a]

Percent

Table 4. Self-Reported Health Status for Workers Age 25–54 by Labor Force Status[a]

Health status	Labor force status (percent)		
	Employed	Unemployed	Not in the labor force
Men			
Excellent	20.0	19.5	12.3
Very good	36.3	29.2	20.6
Good	31.9	35.1	24.4
Fair	10.7	13.9	25.4
Poor	1.2	2.3	17.3
No. of observations	7,277	468	683
Women			
Excellent	20.9	16.3	16.6
Very good	37.0	25.6	24.0
Good	30.9	36.3	28.0
Fair	10.0	18.1	19.3
Poor	1.1	3.7	12.1
No. of observations	7,453	637	2,265

Table 5. Disability Rates Conditional on Labor Force Status for Men Age 25–54, 2009–17[a]

Disability	Labor force status (percent)		
	Employed	*Unemployed*	*Not in the labor force*
Difficulty dressing or bathing	0.2	0.4	7.4
Deaf or difficulty hearing	0.9	1.5	4.0
Blind or difficulty seeing	0.4	1.0	4.0
Difficulty doing errands such as shopping	0.3	0.9	14.9
Difficulty walking or climbing stairs	0.8	2.1	19.6
Difficulty concentrating, remembering, or making decisions	0.8	2.6	16.5
Any disability	2.6	6.0	33.7
Multiple disabilities	0.5	1.6	18.6
No. of observations	2,130,004	143,446	280,772

Source: U.S. Bureau of Labor Statistics, Current Population Survey.

a. The sample is pooled over January 2009 to May 2017 for men age 25–54. Specific disabilities are not mutually exclusive.

on documenting the nature, and probing the veracity, of their health-related problems. Although it is certainly possible that extended joblessness and despair induced by weak labor demand could have caused or exacerbated many of the physical, emotional, and mental health–related problems that currently afflict many prime age, NLF men, the evidence in this section nonetheless suggests that these problems are a substantial barrier to working that would need to be addressed to significantly reverse the downward trend in participation.

Beginning in 2008, the BLS has regularly included a series of six functional disability questions in the monthly CPS. For example, the survey asks, "Is anyone [in the household] blind or does anyone have serious difficulty seeing even when wearing glasses?"[17] Pooling all the data from 2008 to 2016, the answers to these questions are reported in table 5, by labor force status for prime age men. At least one disability was reported for 34 percent of prime age, NLF men, and this figure rises to 42 percent for the

17. One could question whether this measure results in an underestimate or overestimate of the "true" disability rate. On one hand, the list is restricted to just six conditions (for example, speech and language disorders are omitted). In addition, there could be a stigma attached to reporting physical, emotional, and mental health conditions for household members. On the other hand, a disability could be self-reported because it is a more socially acceptable reason for joblessness than the alternative.
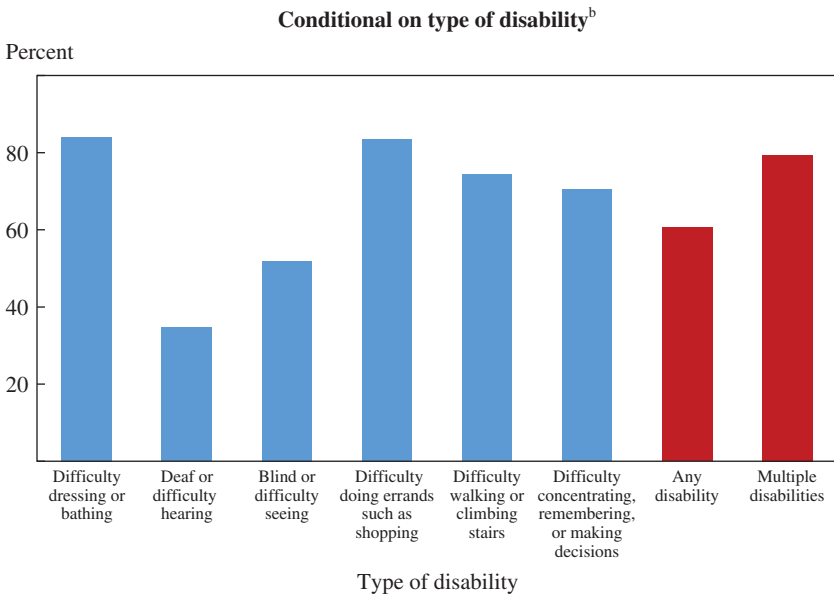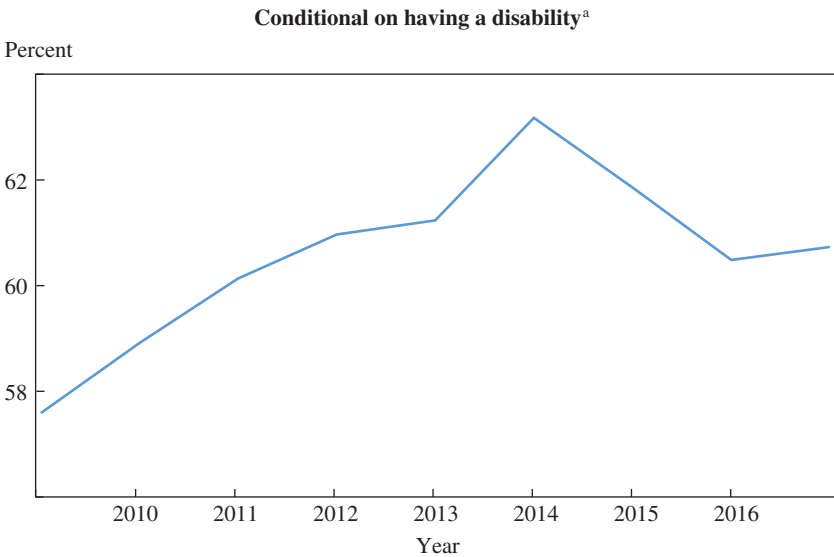
subset of men age 40–54.[18] Perhaps surprisingly, prime age, white men were more likely to report having at least one of the six conditions (35.8 percent) than were prime age, African American men (32.3 percent) or Hispanic men (29.3 percent). At least one disability condition was reported for 40 percent of nonparticipating prime age men with a high school education or less. The most commonly reported disabilities were "difficulty walking or climbing stairs" and "difficulty concentrating, remembering, or making decisions"; about half reported multiple disabilities. Only 2.6 percent of employed men and 6.0 percent of unemployed men in this age group reported a disability.

The top panel of figure 6 shows the probability of being out of the labor force conditional on having a disability each year from 2008 to 2017. The probability of being out of the labor force conditional on having a disability has trended up, which suggests that the improvement in the job market over this period is not drawing disabled individuals back to work. Pooling all the data together, the bottom panel of figure 6 shows the probability of being out of the labor force for each of the six conditions, for those who indicate having any of the six conditions, and for the subset with multiple conditions. Those who have difficulty dressing, running errands, walking, or concentrating have a much lower labor force participation rate than those who are blind or have difficulty seeing or hearing.

PREVALENCE OF PAIN AND PAIN MEDICATION: ATUS AND CDC For randomly selected episodes of the day, the ATUS-WB asked respondents, "From 0 to 6, where a 0 means you did not feel any pain at all and a 6 means you were in severe pain, how much pain did you feel during this time if any?" The first row of table 6 reports the average pain rating by labor force status (weighted by episode duration), and the second row reports the fraction of time respondents reported a pain rating above 0, indicating the presence of some pain. The results indicate that individuals who are out of the labor force report experiencing a greater prevalence and intensity of pain in their daily lives. As a group, workers who are out of the labor force report

18. A natural question is whether an increase in the number of disabled military veterans returning to civilian life has contributed to the decline in the labor force participation rate. The short answer is that this does not appear to be the case. The share of prime age, NLF men who are veterans has declined, from 11.4 percent in 2008 to 9.7 percent in 2016. Moreover, the proportion of prime age men who are veterans has trended down over the last two decades as the large cohort of Vietnam-era veterans has aged out of the prime age category. Nevertheless, about 40 percent of veterans who are out of the labor force report a significant disability, so any strategy to assist veterans to return to the labor force would need to address disability issues.

Figure 6. Probability of Men Age 25–54 Not Being in the Labor Force, 2009–17

Conditional on having a disability[a]

Percent

Year

Conditional on type of disability[b]

Percent

Type of disability

Sources: Current Population Survey; author's calculations.
a. The 2017 data point is the average of data from January through May.
b. The bar heights are averages of data from January 2009 through May 2017.

Table 6. Prevalence of Pain and Pain Medication Use for Men Age 25–54 by Labor Force Status[a]

	Labor force status		
Measure of pain	*Employed*	*Unemployed*	*Not in the labor force*
All men age 25–54			
Average pain rating from 0 to 6	0.75	0.87	1.96
Percentage of time spent with pain	29.8	29.0	53.2
Percentage who took pain medication yesterday	20.2	18.9	43.5
No. of activities	21,650	1,391	2,021
No. of observations	7,277	468	683
Disabled men age 25–54			
Average pain rating from 0 to 6	1.56	1.25	3.00
Percentage of time spent with pain	54.6	29.7	70.0
Percentage who took pain medication yesterday	32.4	12.4	57.7
No. of activities	564	74	811
No. of observations	191	25	276

Source: U.S. Bureau of Labor Statistics, American Time Use Survey, Well-Being Module.

a. The sample is pooled over 2010, 2012, and 2013 for men age 25–54. Average pain ratings are weighted using the Well-Being Module's adjusted pooled activity weights. Time spent with pain and pain medication use are weighted using the Well-Being Module's final weights.

feeling pain during about half their time. And for those who report a disability, the prevalence and intensity of pain are higher—disabled prime age men who are out of the labor force report spending 70 percent of their time in some pain, and an average pain rating of 3.0 throughout the survey day.

Comparing the daily pain ratings of employed and NLF men who report a disability indicates that the average pain rating is 89 percent higher for those who are out of the labor force. Moreover, for five of the six disability categories, reported pain is more prevalent and more intense for those who are out of the labor force than for those who are employed. These results suggest that the disabilities reported for prime age men who are out of the labor force are more severe than those reported for employed men, on average.

The ATUS-WB also asked respondents, "Did you take any pain medication yesterday, such as Aspirin, Ibuprofen or prescription pain medication?" Fully 44 percent of prime age, NLF men acknowledged taking pain medication the previous day, although this encompasses a wide range of medications. This rate was more than double that of employed and unemployed

men. (The gap was not as great for prime age women; 25.7 percent of employed women reported taking pain medication on the reference day, compared with 34.7 percent of NLF women.) And if we limit the comparison to men who report a disability, those who were out of the labor force were more likely to report having taken pain medication (58 percent) than were those who were employed (32 percent), again suggesting the disabilities are more severe, on average, for those who are out of the labor force. The high rate of pain medication utilization for NLF men is possibly related to Case and Deaton's (2015, 2017) finding of a rise in mortality for middle age whites due to accidental drug poisonings, especially from opioid overdoses, from 1999 to 2013. I return to this issue below.
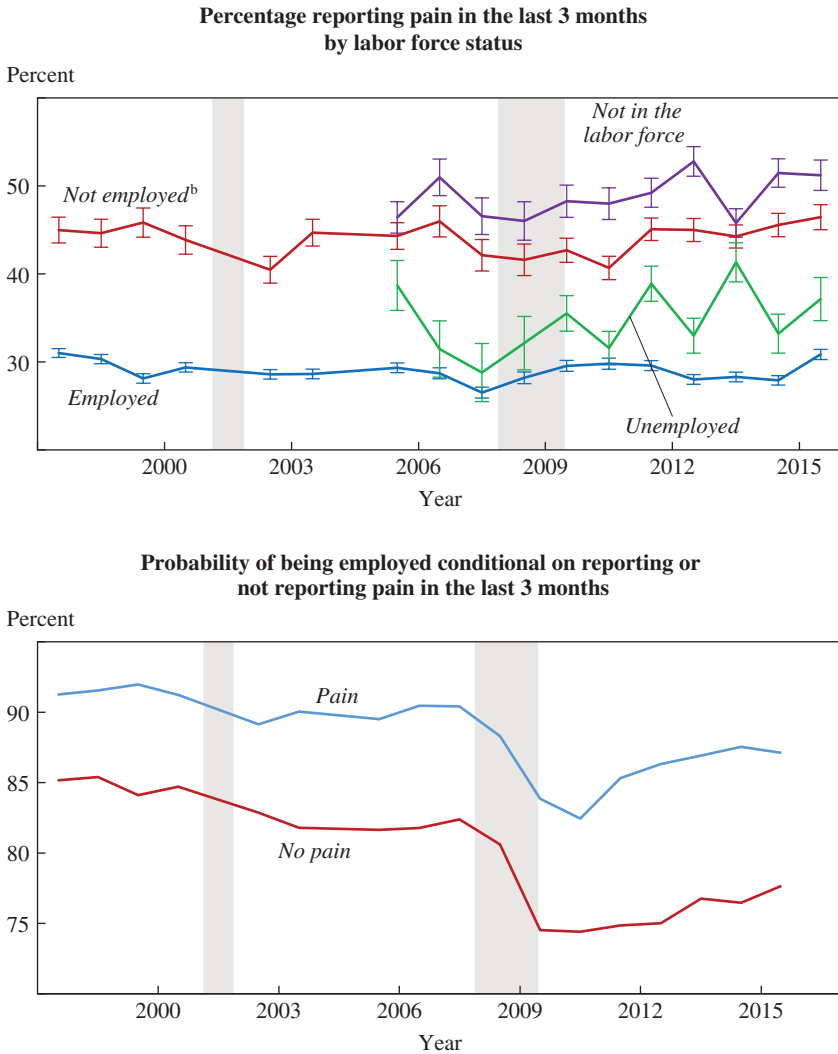
Since 1997, the Centers for Disease Control and Prevention's (CDC's) National Health Interview Survey has annually asked cross sections of more than 300,000 individuals whether they experienced pain in the last three months. Specifically, respondents are instructed, "Please refer to pain that LASTED A WHOLE DAY OR MORE. Do not report aches and pains that are fleeting or minor." The top panel of figure 7 displays trends in the percentage of prime age men reporting pain in the last three months by labor force status.[19] (Beginning in 2005, the unemployed can be distinguished from other nonemployed workers.) Although the data are volatile from year to year, there is a slight upward trend in the share of NLF and unemployed prime age men who report experiencing pain in the last three months. The trend is essentially flat for employed men, and for men as a whole. Despite the extraordinary rise in the use of opioid pain medication over this period, there is no indication of a decline in the proportion of men who report feeling pain.

The National Health Interview Survey data displayed in the bottom panel of figure 7 also suggest that the employment consequences of feeling pain have increased. In 1997, prime age men who reported experiencing pain in the past three months were 6 percentage points less likely to work than were those who reported that they did not experience pain; by 2015, this difference had increased to 10 percentage points.

PRESCRIPTION PAIN MEDICATION, DISABILITY, AND LABOR FORCE DROPOUTS: THE PRINCETON PAIN SURVEY To better understand the role of pain and pain medication in the life of prime age men who are neither working nor looking for work, I conducted a short online panel survey of 571 NLF men

19. Any individual who reported lower back pain, neck pain, leg pain, or jaw pain is coded as having experienced pain. For the details of the survey, see https://www.cdc.gov/nchs/nhis/.

Figure 7. Percentage of Men Age 25–54 Reporting Pain, by Labor Force Status, and Probability of Men Age 25–54 Being Employed, by Pain Status, 1997–2015[a]
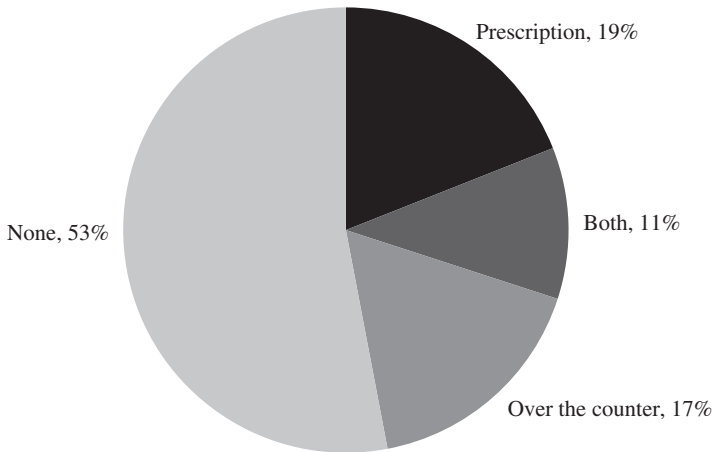
Percentage reporting pain in the last 3 months by labor force status

Probability of being employed conditional on reporting or not reporting pain in the last 3 months

Sources: Centers for Disease Control and Prevention, National Health Interview Survey; National Bureau of Economic Research; author's calculations.

a. Shading denotes recessions. Pain must last a whole day or more, and includes back pain, neck pain, leg pain, jaw pain, severe headaches, and migraines. The intervals shown for each year represent one standard error.

b. Not employed includes both unemployed and not in the labor force.

Figure 8. Consumption of Pain Medication by Men Age 25–54 Who Are Out of the Labor Force[a]

Source: Princeton Pain Survey.
a. The data are based on 571 responses to the question, "Did you take any pain medication yesterday?" The survey was administered between September 30, 2016, and October 2, 2016.

age 25–54 using an Internet panel provided by Survey Sampling International (henceforth, the Princeton Pain Survey, PPS).[20] The first wave of the survey was conducted over the period September 30, 2016, to October 2, 2016. The results of this survey underscore the role of pain in the lives of nonworking men, and the widespread use of prescription pain medication. Fully 47 percent of prime age, NLF men responded that they took pain medication the previous day, slightly higher than but not significantly different from the corresponding share for the ATUS sample. Nearly two-thirds of those who took pain medication indicated that they took *prescription* pain medication (in 36 percent of these cases, the men reported that they also took over-the-counter pain medication); see figure 8. Thus, on any given day, 30 percent of prime age, NLF men took pain medication, most likely an opioid-based medication. And these figures likely

20. We screened for men age 25–54 who did not work in the previous week, were not absent from a job, and did not search for a job in the previous week. Because the BLS definition of "out of the labor force" requires that individuals did not search for a job in the past four weeks, our definition is a bit less restrictive. Weights were developed to match the 2016 CPS Annual Social and Economic Supplement by age group (25–40 and 41–54), race, and Hispanic ethnicity. Weighted percentages are reported in the text. The survey was conducted using Qualtrics software.

Table 7. Percentage of Men Age 25–54 Taking Prescription Pain Medication[a]

| | Wave 2 | |
	No	*Yes*
No	64.9	8.1
Yes	6.1	20.9

Source: Princeton Pain Survey.
a. The sample consists of 150 respondents who did not have a steady, full-time job during wave 2 of the survey. The data are weighted using survey weights that have been adjusted to match age, race, and ethnicity figures from the Current Population Survey's Annual Social and Economic Supplement for 2016.

understate the actual proportion of men taking prescription pain medication, given the stigma and legal risk associated with reporting the taking of narcotics.

Forty percent of this sample of prime age men responded "yes" when asked directly, "Does pain prevent you from working on a full-time job for which you are qualified?" Two-thirds of the men in the PPS reported that they had a disability, which is about double the rate in the CPS for prime age, NLF men. The higher disability rate partly resulted because respondents could write "other" in addition to the BLS's six conditions, and 16 percent filled out other.[21] It is also possible that men who are drawn to participate in Internet surveys are more likely to suffer from a disability, or that the CPS understates the number of prime age men with a disability.

A follow-up online survey conducted July 7–14, 2017, attempted to interview the 376 respondents who continued in the PPS panel, a little over 9 months after the initial survey. A total of 156 prime age men responded to the follow-up survey, or 41 percent of those who were eligible. Six of the respondents said that they had a steady, full-time job and were dropped from the sample, so the resulting analysis sample has 150 observations. Table 7 reports a cross-tabulation indicating the proportion who took prescription pain medication in the preceding day in waves 1 and 2 of the survey. The cross-tabulation indicates the persistence of taking pain medication, which is consistent with studies that find high rates of addiction to opioid medication (Frieden and Houry 2016). Nearly 80 percent of those who took prescription pain medication in the initial survey reported taking it in the follow-up survey.

21. Common write-in responses for those who marked "other" included anxiety disorder, back pain, cancer, chronic pain, epilepsy, heart condition, and sleep disorder.

Table 8. Percentage of Men Age 25–54 Taking Prescription Pain Medication Using Various Methods of Payment[a]

Payment method	Percent
Out of pocket	24.7
Private health insurance	13.0
Medicaid	37.7
Medicare	29.2
Veterans Affairs or Tricare[b]	9.6
Other	10.3

Source: Princeton Pain Survey.

a. The sample consists of 94 respondents who did not have a steady, full-time job during wave 2 of the survey. The data are weighted using survey weights that have been adjusted to match age, race, and ethnicity figures from the Current Population Survey's Annual Social and Economic Supplement for 2016.

b. Veterans Affairs and Tricare are not explicit categories, but were often listed if the respondent selected "other." Respondents citing these methods are not included in the total for the "other" category.

Individuals in the follow-up survey were asked, "About how often would you say that you take prescription pain medication?" Almost a quarter (24 percent) responded that they took it every day, another 18 percent said more than once a week, and 3 percent said once a week. A minority (41 percent) responded "never." All respondents except those who said they never take prescription pain medication were asked, "How do you usually pay for prescription pain medication? (Mark all that apply.)" The results are shown in table 8. It is clear that government health insurance programs (Medicaid, Medicare, Veterans Affairs) play a major role in providing pain medication to this group. Two-thirds of respondents used at least one of these government programs to purchase prescription pain medication, with the largest group relying on Medicaid.

Respondents were asked, "What is the source of pain that typically causes you to take pain medication?" Overwhelmingly, they selected a non-work-related injury over a work-related one—88 percent to 12 percent.

In the first wave of the PPS, respondents were asked about their participation in various income support programs. Table 9 provides the responses. Half the prime age, NLF men report participating in at least one program. Thirty-five percent of the prime age, NLF men indicated that they were on Social Security Disability Insurance (SSDI), compared with 25 percent in the May 2012 CPS disability supplement (BLS 2013). The difference is likely a result of the PPS sample being nonrepresentative, underreporting in CPS, and an increase in SSDI participation from May 2012 to July 2017. Workers' compensation insurance is a much less frequent source of income

Table 9. Percentage of Men Age 25–54 in Income Support Programs[a]

	Income support program	*Percent*
	Workers' compensation	1.8
	Social Security Disability Insurance	35.0
	Supplemental Security Income	10.1
	Veterans disability compensation	6.0
	Disability insurance	5.2
	Other	2.4
	None	49.6

Source: Princeton Pain Survey.

a. The sample consists of 571 respondents. The order of response categories was randomized across respondents (except for "other" and "none"). The data are weighted using survey weights that have been adjusted to match age, race, and ethnicity figures from the Current Population Survey's Annual Social and Economic Supplement for 2016.

support than SSDI, consistent with work-related injuries being reported as a source of pain in only a small percentage of cases.

In the PPS follow-up survey, respondents who were not currently on SSDI were asked if they had ever applied for SSDI. Fully 30 percent of those asked indicated that they had previously applied for SSDI.[22] Many of these individuals could be in the process of applying for SSDI or appealing a decision, which could influence their current labor supply incentives.[23] *If the fraction of prime age, NLF men on SSDI is between 25 and 35 percent, then about half of all prime age, NLF men could have applied for SSDI at some point.* This suggests that the program's reach is substantially larger than previously appreciated.

The role of SSDI in reducing male labor force participation has long been debated by economists (Parsons 1980; Bound 1989). The CEA (2014) reports that the fraction of prime age men on disability insurance rose from 1 to 3 percent between 1967 and 2014, while the labor force participation rate of this group fell by 7.5 percentage points, which suggests that disability insurance could at most account for a quarter of the decline in participation over this period. Also, estimates of the causal effect of disability

22. Among the subset of individuals who were not on any income support program, 20 percent reported that they had previously applied for SSDI.

23. The Social Security Administration (2017, p. 7) advises applicants for SSDI: "If you're working and your earnings average more than a certain amount each month, we generally won't consider you to be disabled." Von Wachter, Song, and Manchester (2011) find that a substantial number of male applicants age 30–44 who are rejected from SSDI tend to work postapplication, while relatively few rejected applicants age 45–64 are employed postapplication.

insurance suggest that the availability of benefits is responsible for even less of the decline in participation. The evidence reported here on the high incidence of pain experienced by the disabled, especially those who are out of the labor force, suggests that physical and mental health ailments are a barrier to participating in many activities.[24]
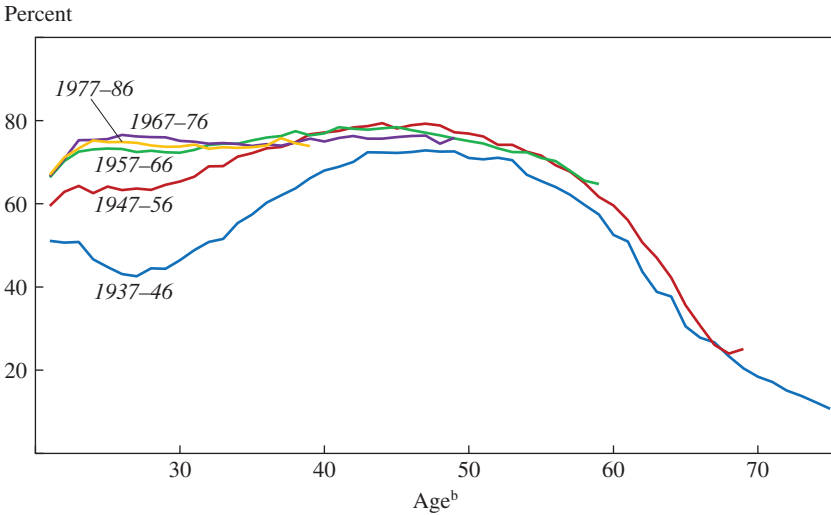
II.C. Women

As mentioned above, the aggregate labor force participation rate in the United States stopped rising after 2000 because the participation rate of women stopped rising. Starting in 2007, the participation rate began to fall for women overall, although the rate had already been declining for younger women over the previous decade. America's relative standing among economically advanced countries in terms of the labor force participation rate of women also slipped. A particularly interesting comparison is with Canada.[25] The participation rate of women in Canada was roughly equal to that in the United States in the late 1990s, but it continued to grow for another decade in Canada, while it plateaued and then declined in the United States. For prime age women, from 1997 to 2015 the participation rate rose from 76 to 81 percent in Canada, while it fell from 77 to 74 percent in the United States. Marie Drolet, Sharanjit Uppal, and Sébastien LaRochelle-Côté (2016) find that the participation rate of women in the United States has declined at all education levels since the 1990s, but it has declined more for women with a high school education or less, especially those age 25-44. In Canada, by contrast, the participation rate has risen for all education groups.

Francine Blau and Lawrence Kahn (2013) conclude that the expansion of "family-friendly" policies, including parental leave and part-time work entitlements, explains 29 percent of the decrease in women's labor force participation in the United States relative to other countries in the Organization for Economic Cooperation and Development.[26] Given that the biggest gap between women's labor force participation in Canada and the United States opened up among less educated women of childbearing age, who are unlikely to receive paid maternity leave and other family benefits, it is plausible that family leave policies, along with the rise in the education–income gradient in the United States, also account for a

24. See Krueger and Stone (2008) on the relationship between pain and time use.

25. Matthew Notowidigdo expands on this relationship between the United States and Canada in his comment.

26. Dahl and others (2016), however, find that the extension of maternity benefits from 18 to 35 weeks in Norway had little effect on labor force participation.

Figure 9. Female Labor Force Participation Rates by Birth Cohort and Age[a]

Percent

Sources: Current Population Survey, Annual Social and Economic Supplement; National Bureau of Economic Research; author's calculations.

a. The data are from 1962 to 2016. The line captions mark the birth year cohorts.

b. The horizontal axis marks the age of the middle birth year cohort.

significant share of the rising gap in participation between women in the United States and Canada.[27]

There is also evidence that generational shifts, which drew increasing numbers of women into the workforce, have come to an end in the United States.[28] This implies that the historic gains in women's labor force participation that resulted from the entry of new birth cohorts and the exit of older ones will no longer lead to rising participation. Figure 9 displays the labor force participation rates of five cohorts of women based on 10 year-of-birth intervals over the life cycle from age 16 to 75, using data from the 1962–2016 CPS Annual Social and Economic Supplement (ASEC). The age displayed along the horizontal axis refers to the age of the middle birth year cohort. (That is, for the 1937–46 birth cohort, the horizontal axis marks the age of those born in 1941, and so on.) The cross-cohort pattern

27. Moffitt (2012) highlights the puzzling fact that the employment rate declined for unmarried women without children, and also for higher-educated women.

28. See Juhn and Potter (2006) for an early discussion of this issue. Goldin and Mitchell (2017) highlight that the life cycle labor force participation profile of women evolved from an inverted U shape for cohorts born before the 1950s to a fairly flat shape with a sagging middle for those born after the mid-1950s.
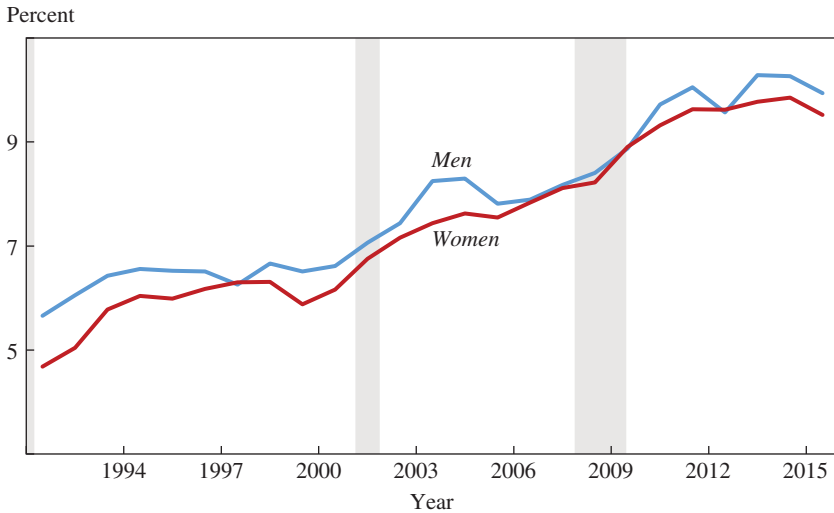
makes clear that at all ages, women in the 1947–56 cohort were more likely to participate in the labor force than were women of the same age born a decade earlier. The increase in labor force participation across succeeding cohorts was particularly evident for women age 21–45. But the cohort life cycle profiles essentially stopped rising after the 1957–66 cohort, and women in the 1977–86 cohort were actually less likely to work at a given age than were women born a decade earlier. And though it is impossible to separate out calendar time, age, and birth year effects, these generational developments are unlikely to represent time effects because they have been occurring over several years, and because participation is not very sensitive to the business cycle.

The cohort pattern in figure 9 also helps explain another anomaly: Why did women age 55–64 exhibit the biggest break from the trend over the last decade, as shown in online appendix figure A15? The answer appears to be that as women born in the late 1940s and early 1950s aged out of the 55–64 age bracket, they were replaced by a succeeding generation of women who had about the same level of participation as the 1947–56 birth cohort when they were both in their late 40s and early 50s. An implication of this pattern is that a continuation of the sharp rise in participation over recent decades for women age 65 and over, which is evident in online appendix figure A16, is likely in jeopardy, as the 1950s birth cohort gives way to the 1960s birth cohort, which had roughly the same labor force participation rate in midlife.

The finding that the cohort labor force participation profiles stopped rising for younger women age 21–40, who are much more likely to be engaged in raising a family, highlights the potential for workplace flexibility and family-friendly policies to raise labor force participation. Clearly, the United States can no longer rely on the past tendency of succeeding generations of women to enter the labor force at earlier ages to lift the aggregate labor force participation rate.

LABOR FORCE NONPARTICIPATION FOR REASONS OTHER THAN HOME RESPONSIBILITIES An important distinction for NLF women involves those who say they are not working mainly because of "home responsibilities" and those who are not working for other reasons. In 1991, 77 percent of prime age, NLF women were not working because of home responsibilities; and in 2015, that figure had declined to 60 percent, according to CPS and ASEC data. (Note that these questions on labor force participation relate to the calendar year, as opposed to the survey reference week.) Among those who cited something *other than* home responsibilities as the main reason for not working, the rise in nonparticipation for women parallels that of men

Figure 10. Persons Age 25–54 Who Were Not in the Labor Force during the Past Year for Reasons Other Than "Home Responsibilities," 1991–2015[a]

Percent

Sources: Current Population Survey, Annual Social and Economic Supplement (data provided by Steven Hipple); U.S. Bureau of Labor Statistics (data provided by Steven Hipple); National Bureau of Economic Research.

a. Shading denotes recessions.

(figure 10).[29] Excluding those who cite home responsibilities, the distribution of reasons for not working for women also roughly equals that of men, with disability or illness representing the largest category. As we shall see below, the distinction between home responsibilities and other reasons also has a meaningful effect on subjective well-being for NLF women.
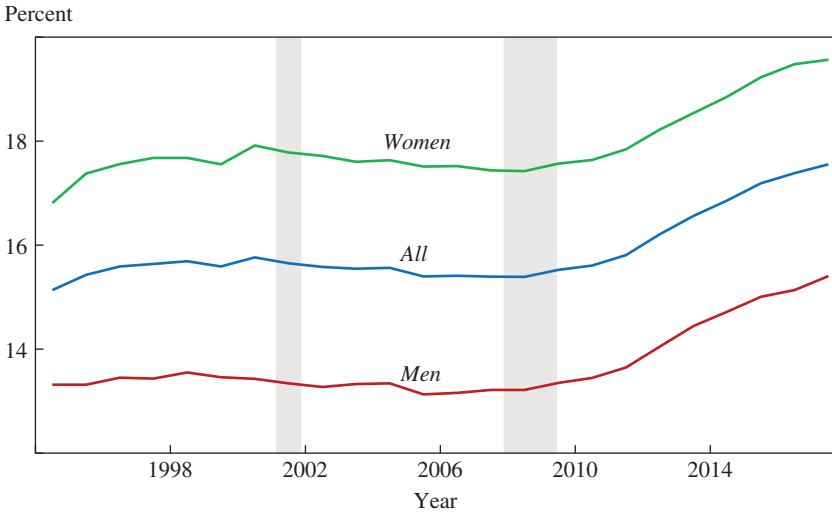
II.D. Retirees

As emphasized in section I, a major reason for the decline in labor force participation after 2007 is that the large baby boom cohort started to reach retirement age, as had long been expected. Those born in 1946, at the beginning of the baby boom, would have qualified for Social Security retirement benefits starting in 2008.

Further evidence of the profound effect of retirement on the U.S. workforce is shown in figure 11, which shows the percentage of individuals age 16 and older who are classified as retired in the CPS.[30] The share of the

29. Steven Hipple of the BLS generously shared these tabulations with me. Also see Lysy (2016) for an analysis of these data.

30. This is based on the EMPSTAT variable in the IPUMS-CPS data.

Figure 11. Retirement Rates by Gender, 1994–2017[a]

Percent

Sources: Current Population Survey; National Bureau of Economic Research; author's calculations.
a. Shading denotes recessions. The retirement rate is the share of the population age 16 and older that reports being retired. The data are not seasonally adjusted, annual averages. The 2017 data point is the average of data from January through May.

population age 16 and older that was retired hovered around 15 percent from 1994 to 2007, and then rose from 15.4 to 17.6 percent from 2007 to 2017. This 2.2 percentage point rise in the retirement rate over this period almost matches the 2.8 percentage point drop in the labor force participation rate over the same period. By gender, the retirement rate has increased by 2.2 percentage points for men and 2.1 percentage points for women since 2007. Because retirements tend to be permanent exits from the labor force, and the main reason for the decline in labor force participation over the past decade is the increasing number of retirements due to the aging of the baby boom generation, this is another reason to expect relatively little cyclical recovery in labor force participation in the near term.

III. Subjective Well-Being

This section evaluates the self-reported subjective well-being (SWB) of various demographic groups by labor force status. A comparison of SWB across labor force groups is of interest for two reasons. First, low levels of SWB can point to social problems for particular groups and potentially large welfare gains from successful interventions. Second, if the members

of a group that is out of the labor force exhibit a high degree of SWB, it is probably unlikely that they are severely discontented with their situation and are eager to change their labor force status. Of course, SWB is difficult to measure and compare across individuals, so the usual caveats apply when using SWB measures.

Two types of measures of SWB are available from the ATUS-WB. The first is the Cantril ladder, a self-anchoring scale that asks respondents to evaluate their life in general, which was included in the 2012 and 2013 waves of the survey.[31] The exact question wording is:

> Please imagine a ladder with steps numbered from 0 at the bottom to 10 at the top. The top of the ladder represents the best possible life for you and the bottom of the ladder represents the worst possible life for you. If the top step is 10 and the bottom step is 0, on which step of the ladder do you feel you personally stand at the present time?

The second measure is the affect rating of randomly selected episodes of the day. This includes ratings of happiness, sadness, stress, pain, meaningfulness, and tiredness on a 0–6 scale. I compute the duration-weighted average of these affect measures as well as the U index. The U index is defined here as the proportion of time in which the rating of sadness or stress exceeds the rating of happiness. Daniel Kahneman and Krueger (2006) emphasize that the U index is robust if respondents interpret the scales differently, as long as they apply the same monotonic transformation to both positive and negative emotions.

The measures are summarized for men and women in tables 10 and 11, respectively. The tables report the mean Cantril ladder rating for each group. Figure 12 further shows the cumulative distributions of the Cantril ladder for each group, where the horizontal axis is arrayed in reverse numerical order (from 10 to 0) so that distributions that lie above lower ones totally dominate in terms of the ladder of life.

A few findings are noteworthy. First, young NLF men and women seem remarkably content with their lives. As a group, young people who are not in the labor force report that their lives are on a higher step of the Cantril ladder of the best possible life than do employed individuals of a similar age. On a moment-to-moment basis, there are only small and typically statistically insignificant differences in the duration-weighted average

---

31. See Kahneman and Deaton (2010) for a comparison of the correlates of the Cantril ladder and daily emotional well-being. They find that the Cantril ladder is more strongly correlated with education and income, while daily emotional well-being is more closely correlated with loneliness and health.

reported emotions across youth who are employed, unemployed, and out of the labor force.

Second, unlike youth, prime age men who are employed are considerably more satisfied with their lives in general than are men who are out of the labor force or unemployed. Prime age, NLF men are between employed and unemployed men on the Cantril ladder of life, but closer to unemployed men. The emotional experiences over the course of the day, however, indicate that NLF men are less happy, more sad, and more stressed than unemployed men, reversing the ranking from the Cantril ladder. Moreover, the U index (which measures unpleasant time but omits pain) is higher for NLF men than for unemployed men. This reversal suggests that there may be more adaptation in overall quality of life expectations for NLF men than there is in terms of their moment-to-moment experience. In other words, prime age, NLF men, who often have a significant disability, may have lowered their views of the best possible life they could expect, and reported their step on the Cantril ladder in relation to this compressed ladder, while their reporting of emotional experience was not recalibrated with respect to expectations. If this is the case, then the low SWB of prime age, NLF men should be an even bigger social concern based on the emotional data than on the ladder-of-life data.[32]

One factor that likely contributes to the low level of emotional well-being of prime age, NLF men is the relatively high amount of time they spend alone. Prime age, NLF men spend nearly 30 percent of their time alone, compared with 18 percent for prime age, employed men and 17 percent for prime age, employed women. Kahneman and Deaton (2010) find that time spent alone correlates more strongly with daily emotional well-being, while income and education correlate more strongly with evaluative well-being.

Third, unlike men, the SWB of prime age, NLF women is closer to that of employed women than it is to that of unemployed women. In fact, the U index is lower for prime age, NLF women than for prime age, employed women. NLF women report higher levels of happiness and sadness but less stress than employed women. Unlike men, women who are out of the labor force report deriving considerable meaning from their activities. These results do not paint a picture of NLF women as a group being discontented with their lives or daily routines and therefore being eager to return to work.

---

32. For the sample of men age 21–30 who were out of the labor force, I find that the Cantril ladder is closer to employed men than to unemployed men, but the U index indicates that they have much lower emotional experience than employed and unemployed men.

Table 10. Subjective Well-Being for Men[a]

| Affect measure | Men, age 16–70 | | | | |
	All	Employed	Unemployed	Not in the labor force	p value[b]
Happiness	4.23	4.25	4.23	4.18	0.436
Tiredness	2.24	2.28	1.95	2.21	0.000
Stress	1.41	1.45	1.40	1.27	0.001
Sadness	0.59	0.53	0.70	0.77	0.000
Pain	0.88	0.73	0.89	1.39	0.000
Meaning	4.21	4.27	4.19	4.03	0.000
U index[c]	0.13	0.13	0.14	0.13	0.647
Cantril ladder[d]	6.97	7.08	6.27	6.83	0.000
No. of observations	13,643	9,999	932	2,712	
No. of activities	40,556	29,747	2,767	8,042	

| Affect measure | Men, age 25–54 | | | | |
	All	Employed	Unemployed	Not in the labor force	p value[b]
Happiness	4.18	4.21	4.15	3.97	0.034
Tiredness	2.30	2.31	1.69	2.59	0.000
Stress	1.55	1.53	1.64	1.76	0.043
Sadness	0.60	0.53	0.79	1.16	0.000
Pain	0.87	0.75	0.87	1.96	0.000
Meaning	4.24	4.27	4.28	4.01	0.070
U index[c]	0.14	0.13	0.18	0.21	0.000
Cantril ladder[d]	6.87	7.03	5.69	6.08	0.000
No. of observations	8,428	7,277	468	683	
No. of activities	25,062	21,650	1,391	2,021	

Source: U.S. Bureau of Labor Statistics, American Time Use Survey, Well-Being Module.

a. Each respondent was asked about three activities. Affects are measured on a 0–6 scale, from least to most affected. The sample is pooled over 2010, 2012, and 2013. Affect measures and the U index are weighted using the Well-Being Module's adjusted pooled activity weights.

b. The *p* value is from an *F* test of equality of the means for the three labor force statuses.

c. The U index measures the proportion of time in which the rating of stress or sadness exceeds the rating of happiness.

d. The Cantril ladder question was asked in 2012 and 2013 only, and is weighted using the Well-Being Module's final weights. It is measured on a 0–10 scale, from "worst possible life" to "best possible life."

	All	Employed	Unemployed	Not in the labor force	p value[b]
Men, age 16–24					
	4.25	4.26	4.32	4.20	0.685
	2.31	2.37	2.25	2.25	0.614
	1.20	1.27	1.13	1.13	0.399
	0.42	0.40	0.53	0.39	0.312
	0.47	0.47	0.56	0.44	0.497
	3.84	3.91	3.92	3.67	0.121
	0.11	0.12	0.09	0.10	0.455
	7.06	6.94	6.81	7.36	0.028
	1,585	769	283	533	
	4,719	2,292	840	1,587	
Men, age 55–70					
	4.34	4.39	4.21	4.29	0.323
	2.05	2.12	1.89	1.97	0.259
	1.22	1.31	1.45	1.07	0.005
	0.67	0.59	0.91	0.77	0.004
	1.18	0.84	1.77	1.59	0.000
	4.41	4.52	4.62	4.24	0.001
	0.11	0.11	0.14	0.10	0.264
	7.14	7.34	6.27	6.92	0.000
	3,630	1,953	181	1,496	
	10,775	5,805	536	4,434	

Table 11. Subjective Well-Being for Women[a]

| | Women, age 16–70 | | | | |
Affect measure	All	Employed	Unemployed	Not in the labor force	p value[b]
Happiness	4.36	4.33	4.39	4.40	0.216
Tiredness	2.52	2.55	2.36	2.48	0.060
Stress	1.61	1.69	1.64	1.44	0.000
Sadness	0.65	0.58	0.77	0.77	0.000
Pain	0.98	0.81	0.92	1.34	0.000
Meaning	4.41	4.40	4.33	4.43	0.560
U index[c]	0.15	0.16	0.16	0.14	0.013
Cantril ladder[d]	7.17	7.22	6.53	7.20	0.000
No. of observations	16,430	10,404	1,042	4,984	
No. of activities	48,815	30,937	3,095	14,783	

| | Women, age 25–54 | | | | |
Affect measure	All	Employed	Unemployed	Not in the labor force	p value[b]
Happiness	4.31	4.29	4.32	4.37	0.375
Tiredness	2.61	2.62	2.38	2.65	0.098
Stress	1.73	1.78	1.72	1.58	0.007
Sadness	0.65	0.60	0.78	0.77	0.001
Pain	0.95	0.83	0.97	1.34	0.000
Meaning	4.45	4.42	4.68	4.49	0.015
U index[c]	0.16	0.17	0.16	0.14	0.029
Cantril ladder[d]	7.13	7.24	6.23	7.03	0.000
No. of observations	10,355	7,453	637	2,265	
No. of activities	30,803	22,176	1,895	6,732	

Source: U.S. Bureau of Labor Statistics, American Time Use Survey, Well-Being Module.

a. Each respondent was asked about three activities. Affects are measured on a 0–6 scale, from least to most affected. The sample is pooled over 2010, 2012, and 2013. Affect measures and the U index are weighted using the Well-Being Module's adjusted pooled activity weights.

b. The *p* value is from an *F* test of equality of the means for the three labor force statuses.

c. The U index measures the proportion of time in which the rating of stress or sadness exceeds the rating of happiness.

d. The Cantril ladder question was asked in 2012 and 2013 only, and is weighted using the Well-Being Module's final weights. It is measured on a 0–10 scale, from "worst possible life" to "best possible life."

	Women, age 16–24				
All	*Employed*	*Unemployed*	*Not in the labor force*	p *value*[b]
4.39	4.35	4.55	4.38	0.228
2.69	2.81	2.51	2.60	0.134
1.51	1.49	1.53	1.52	0.964
0.46	0.37	0.68	0.48	0.031
0.58	0.52	0.79	0.57	0.279
3.96	3.93	4.03	3.99	0.832
0.14	0.14	0.13	0.13	0.937
7.06	6.97	6.92	7.29	0.116
1,574	770	263	541	
4,666	2,280	778	1,608	

	Women, age 55–70				
All	*Employed*	*Unemployed*	*Not in the labor force*	p *value*[b]
4.44	4.46	4.06	4.44	0.390
2.18	2.14	1.59	2.26	0.025
1.39	1.49	1.68	1.27	0.004
0.79	0.67	1.12	0.89	0.000
1.31	0.94	1.20	1.69	0.000
4.62	4.71	3.82	4.58	0.030
0.14	0.14	0.23	0.13	0.137
7.31	7.33	6.49	7.34	0.017
4,501	2,181	142	2,178	
13,346	6,481	422	6,443	

Figure 12. Cumulative Distributions of Cantril Ladder by Age and Gender[a]

Figure 12. Cumulative Distributions of Cantril Ladder by Age and Gender [a] (*Continued*)

Source: U.S. Bureau of Labor Statistics, American Time Use Survey, Well-Being Module.
a. The sample is pooled over 2012 and 2013. The Cantril ladder question is weighted using the Well-Being Module's final weights, and is measured on a 0–10 scale from "worst possible life" to "best possible life." See the text for the exact wording of the survey question.

Fourth, prime age, NLF women who are not working for reasons other than home responsibilities report notably lower levels of SWB than other NLF women and employed women. The U index for NLF women who are not employed for a reason other than "taking care of house or family" is .20, as compared with .10 for NLF women who are not employed because of home responsibilities, and .17 for employed and unemployed women.[33] Additionally, prime age, NLF women who are not employed for a reason other than home responsibilities report a much lower average step on the Cantril ladder (6.4) and a much greater incidence of pain and the use of pain medication (53 percent took pain medication the preceding day, compared with 27 percent of other NLF women). Thus, NLF women are a bifurcated group, with those who cite home responsibilities as the reason for not working reporting higher levels of SWB and meaning in their lives, and those who are NLF for other reasons expressing higher levels of distress and discomfort.

Finally, women age 55–70 appear to be similar to prime age women in that those in the NLF group report about equal contentment with their lives as a whole and with daily emotional experiences as employed women. Unemployed women age 55–70, however, appear quite unhappy and dissatisfied with their lives. Men in the age 55–70 group who are unemployed also appear to be quite dissatisfied and unhappy with their lives compared with employed men of the same age, while NLF men appear midway between employed and unemployed men on the Cantril ladder. NLF men express relatively low levels of meaning in their daily activities, but their U index indicates that less time was spent in an unpleasant state than employed or unemployed men.

IV. Pain Medication, Opioid Proliferation, and Labor Force Participation

Vance (2016, p. 19) warns that "an epidemic of prescription drug addiction has taken root." Many alarming statistics bear out his fear. According to the CDC, sales of prescription opioid medication per capita were 3.5 times higher in 2015 than in 1999.[34] More than one in five individuals insured by Blue Cross Blue Shield received an opioid prescription in 2015 (Fox 2017). Enough opioid medication is dispensed annually in the United States to

---

33. To be precise, NLF status is determined from the ATUS, and the subset of NLF women who are not employed because they are "taking care of house or family" is identified from the final CPS interview.

34. See https://www.cdc.gov/vitalsigns/opioids/images/graphic-a-1185px.png.

keep every man, woman, and child on painkillers for a month (Doctor and Menchine 2017). The number of deaths from opioid overdoses quadrupled from 1999 to 2015. In 2015, more than 33,000 Americans died from an opioid overdose, more than double the number murdered. An estimated 1 in every 550 patients who started on opioid therapy died from an opioid-related cause, with the median fatality occurring within 2.6 years of the initial prescription (Frieden and Houry 2016). Fully 44 percent of Medicare recipients under age 65 were prescribed opioid medication in 2011 (Morden and others 2014). And despite the rapid diffusion of opioid medication in the United States, there is little evidence showing that opioid treatment is efficacious in reducing pain or improving functionality. In fact, Thomas Frieden and Debra Houry (2016, pp. 1501–02) note that "several studies have showed that use of opioids for chronic pain may actually worsen pain and functioning, possibly by potentiating pain perception."

The opioid crisis preceded the Great Recession—indeed, opioid prescriptions fell from 2010 to 2015—and varying prescription rates are probably rooted in changing medical practices and norms, and more aggressive marketing strategies by pharmaceutical companies (Doctor and Menchine 2017; Satel 2017). Doctor training also seems to affect opioid prescription rates. Molly Schnell and Janet Currie (2017), for example, find that doctors from the lowest-ranked medical schools write 33 times more opioid prescriptions per year than do doctors from the highest-ranked schools, controlling for county and type of medical practice. Eleanor Krause and Isabel Sawhill (2017, p. 21) find that "the ten counties with the highest prime-age male mortality rates due to these 'deaths of despair' [alcohol, suicide, and accidental poisonings] in the CDC database had an average prime-age male participation rate of 73 percent in 2014, compared to 88 percent for the prime-age male population across the country." Although the direction of causality is unclear, Goldman Sachs economist David Mericle notes that "the opioid epidemic is intertwined with the story of declining prime-age participation, especially for men, and this reinforces our doubts about a rebound in the participation rate" (Cheng 2017).

There is a clear regional pattern to opioid prescription rates and drug overdoses. The average quantity of opioids prescribed per capita varies by a factor of 31 to 1 in the top 10 percent of counties relative to the bottom 10 percent of counties, according to CDC data. The CDC argues that "health issues that cause people pain do not vary much from place to place, and do not explain this [state-to-state] variability in prescribing."[35]

---

35. See https://www.cdc.gov/drugoverdose/data/prescribing.html.

In this section, I probe the connection between the use of pain medica-tion and local opioid prescription rates, controlling for individual health conditions and other characteristics. Consistent with the CDC's assertion, the evidence suggests that local opioid prescription practices influence the use of pain medication, conditional on individuals' disability status, self-reported health, and demographic characteristics. Leveraging local differences in prescription rates, regressions indicate that the labor force participation rate is lower and fell more in counties where more opioids were prescribed, controlling for the area's share of manufacturing employ-ment and individual characteristics.

IV.A. The Use of Pain Medication and Opioid Prescription Practices

To explore the relationship between local medical practices and the use of pain medication, I merge county-level data on the volume of opioid pre-scriptions per capita in 2015 from the CDC with data from the ATUS-WB, which includes data on whether individuals took any pain medication on the preceding day.[36] Opioid prescriptions are measured by morphine milligram equivalent (MME) units prescribed per capita, which is a standard way of aggregating different opioid medications. To ease the interpretation, I take the log of MME units per capita in the county.[37]

Table 12 summarizes the results of linear probability models predict-ing whether an individual took pain medication on the preceding day as a function of opioid prescription rates in the area, functional disability status, self-reported overall health, and personal characteristics. Not surprisingly, in areas where more opioids are prescribed, individuals are more likely to report that they took pain medication on the preceding day. Column 1 shows that a 10 percent increase in the amount of opioids prescribed per capita is associated with a 0.6 percentage point, or 2 percent, increase in the share of individuals who report taking pain medication on any given day.[38]

---

36. Specifically, the CDC data on MME per capita were merged to the ATUS based on county FIPS codes. If the FIPS code was missing for a metropolitan area in the ATUS, the average MME for the counties that made up that metropolitan area was matched to the ATUS; and if an individual was not residing in a metropolitan area and lacked a FIPS code in the ATUS, he or she was linked to the average MME per capita in nonmetropolitan areas in the balance of the state.

37. Although one might expect a one-to-one correspondence between opioid prescription rates and the use of pain medication absent other controls, there are two important reasons why such a direct relationship does not hold in these data. First, the dependent variable includes many forms of pain medication in addition to opioids; and second, the independent variable reflects dosage as well as usage, whereas the dependent variable only reflects usage.

38. If separate regressions are estimated for men and women, the coefficient on log opioids per capita is larger for men than for women, but the difference is not statistically significant.

Table 12. Linear Probability Models for the Likelihood of Taking Pain Medication[a]

	Mean [SD]	Took pain medication yesterday					
		(1)	(2)	(3)	(4)	(5)	(6)
Log opioids prescribed per capita	6.389	0.060***	0.047***	0.050***	0.036***	0.028***	0.026***
	[0.396]	(0.010)	(0.010)	(0.011)	(0.010)	(0.010)	(0.009)
Difficulty dressing or bathing	0.011		0.086**			0.067*	0.069*
	[0.104]		(0.041)			(0.038)	(0.037)
Vision impairment	0.011		0.057*			–0.000	0.001
	[0.105]		(0.033)			(0.030)	(0.029)
Difficulty hearing	0.014		0.093***			0.043*	0.041
	[0.119]		(0.028)			(0.026)	(0.026)
Difficulty doing errands	0.021		0.104***			0.066**	0.065**
	[0.145]		(0.036)			(0.032)	(0.031)
Difficulty walking	0.045		0.333***			0.160***	0.160***
	[0.207]		(0.019)			(0.020)	(0.020)
Difficulty remembering	0.024		0.067***			0.032	0.031
	[0.154]		(0.023)			(0.021)	(0.021)
Health status[b]							
Very good	0.342			0.064***		0.053***	0.052***
	[0.474]			(0.008)		(0.008)	(0.008)
Good	0.302			0.142***		0.123***	0.122***
	[0.459]			(0.009)		(0.009)	(0.008)
Fair	0.127			0.294***		0.240***	0.241***
	[0.334]			(0.012)		(0.012)	(0.012)
Poor	0.036			0.525***		0.387***	0.385***
	[0.187]			(0.021)		(0.023)	(0.023)

Table 12. Linear Probability Models for the Likelihood of Taking Pain Medication[a] (*Continued*)

| | Mean [SD] | Took pain medication yesterday | | | | | |
		(1)	(2)	(3)	(4)	(5)	(6)
Race[c]							
African American	0.124 [0.330]				−0.028*** (0.009)	−0.039*** (0.009)	−0.042*** (0.009)
Other	0.067 [0.249]				−0.067*** (0.010)	−0.080*** (0.010)	−0.073*** (0.010)
Gender[d]							
Female	0.508 [0.500]				0.054*** (0.007)	0.047*** (0.006)	0.046*** (0.006)
Age	41.578 [15.353]				0.007*** (0.001)	0.002 (0.001)	0.002 (0.001)
Age^2/1,000	1.964 [1.302]				−0.003 (0.016)	0.032** (0.016)	0.032** (0.016)
Years of education	13.582 [3.078]				−0.008*** (0.001)	0.001 (0.001)	0.002 (0.001)
Marital status[e]							
Married	0.528 [0.499]				−0.026*** (0.006)	0.003 (0.007)	0.002 (0.007)

Region[f]

	(1)	(2)	(3)	(4)	(5)	(6)
Mid-Atlantic	0.128					−0.034
	[0.334]					(0.034)
East North Central	0.161					−0.004
	[0.368]					(0.034)
West North Central	0.074					0.000
	[0.262]					(0.034)
South Atlantic	0.187					−0.015
	[0.390]					(0.034)
East South Central	0.059					0.000
	[0.236]					(0.036)
West South Central	0.116					0.002
	[0.321]					(0.034)
Mountain	0.071					−0.029
	[0.256]					(0.034)
Pacific	0.155					−0.039
	[0.362]					(0.034)
Adjusted R^2	0.003	0.043	0.072	0.060	0.119	0.120
No. of observations	30,073	30,073	30,073	30,073	30,073	30,073

Sources: U.S. Bureau of Labor Statistics, American Time Use Survey, Well-Being Module; Centers for Disease Control and Prevention, QuintilesIMS (IQVIA); author's calculations.

a. The sample is pooled over 2010, 2012, and 2013 for individuals age 16–70. The mean of the dependent variable is 0.270. The regressions are weighted using the Well-Being Module's final weights. Robust standard errors clustered by county are in parentheses. Statistical significance is indicated at the ***1 percent, **5 percent, and *10 percent levels.

b. The omitted category is "Excellent."

c. The omitted category is "White."

d. The omitted category is "Male."

e. The omitted category is "Single."

f. The omitted category is "New England."

This effect is cut roughly in half but remains highly statistically significant when controls are added for functional disabilities, self-reported health, and demographic characteristics (column 5). Even within detailed regions, the area-wide prescription rate is a significant predictor of whether individuals took pain medication the preceding day (column 6). These findings support the CDC's view that differences in health conditions do not vary enough across areas to explain the large cross-county differences in the use of pain medication.

IV.B. *Opioid Prescription Rates and Labor Force Participation*

Next, I link 2015 county-level opioid prescription rates (MME per capita) to individual-level labor force data from the CPS for the periods 1999–2001 and 2014–16.[39] Table 13 reports estimates of linear probability models for prime age men, where the dependent variable is 1 if an individual participates in the labor force and 0 if he does not. Table 14 has comparable estimates for prime age women. A dummy variable indicates the 2014–16 period.

Consider first the results for men. Column 1 of table 13 indicates that the labor force participation rate fell by 3.2 percentage points for men from 1999–2001 to 2014–16. Column 2 adds the opioid prescription rate for 2015, and column 3 adds an interaction between the opioid prescription rate and the 2014–16 period dummy. Both these additional variables are negative and significant, indicating that labor force participation is lower in areas of the United States with a high rate of opioid prescriptions, and labor force participation fell more over this 15-year period in areas with a high rate of opioid prescriptions. These conclusions continue to hold when additional variables are included in the model, including demographics, eight region indicators, the share of manufacturing employment in the county during the period 1999–2001, and the manufacturing share interacted with the 2014–16 period dummy.[40] I continue to find a negative and statistically significant interaction between the 2014–16 period and opioid prescriptions when unrestricted county dummies are included in column 7

---

39. To be more precise, in 41 percent of observations, opioid prescriptions prescribed per capita could be matched directly at the county level; in 34 percent of the observations, I had to aggregate over counties to match at the metropolitan or central city level; and in the remaining cases, I used the average of counties in the balance of the state. For simplicity, I refer to all these areas as "counties."

40. The manufacturing share of employment for 1999–2001 was calculated from the CPS, and merged based on county (where available), metropolitan area (where county was not available), or state (where county and metropolitan area were not available).

to absorb persistent area effects. The fact that the coefficients on the opioid prescription variables are unchanged when the manufacturing variables are included in the regression in column 6 suggests that the opioid crisis is occurring in areas outside traditional manufacturing strongholds. And I find similar results (in a regression not shown here) using the China import exposure variables developed by David Autor, David Dorn, and Gordon Hanson (2013) in place of the share in manufacturing.

These regressions are difficult to interpret for a number of reasons. But if cross-county differences in opioid prescription rates can be taken as an exogenous result of differences in medical practices and norms, conditional on personal characteristics and broad region dummies, the effect of the growth in opioid prescriptions on the labor force can be estimated. In particular, I assume that the base opioid prescription rate coefficient reflects inherent differences across regions, and the interaction between prescriptions and time captures the effect of changes in prescriptions on labor force participation over time. This is a big leap, and ideally I would have preferred to have a baseline measure of prescriptions (county-level MME data are unavailable before 2010), so this calculation is best considered illustrative. These caveats aside, opioid prescriptions per capita increased by a factor of 3.5 nationwide between 1999 and 2015, which is the equivalent of 0.55 log points. Multiplying 0.55 by the coefficient on the interaction between opioids and the second period (–0.011) suggests that the increase in opioid prescriptions could perhaps account for a 0.6 percentage point decline in male labor force participation, which is 20 percent of the observed decline during this period.

The results for women indicate a similar coefficient for the interaction term between time and county-level opioid prescription rates, but the base opioid prescription rate is positive. If the preceding calculation is conducted for women, about one quarter of the decline in labor force participation can be accounted for by the growth in opioid prescriptions.

An obvious concern about the labor force regressions is that omitted variables, such as workers' health conditions that cause pain and demand for pain medication, are correlated with county-level opioid prescription rates. For example, the incidence of obesity has increased in the United States, and it is plausible that the rise in obesity has led to increased back pain and other health ailments, which in turn have caused both labor force participation to decline and demand for pain medication to rise. Although the basic monthly CPS does not include information on health, the ASEC does include information on self-reported health. If one estimates the labor force regressions, pooling together men and women using this smaller

Table 13. Linear Probability Models for Labor Force Participation of Men Age 25–54[a]

	Mean [SD]	Participated in the labor force						
		(1)	(2)	(3)	(4)	(5)	(6)	(7)
Period 2 dummy	0.511	−0.032***		0.067***	0.038*	0.037*	0.039*	0.049*
(2014–16)	[0.500]	(0.002)		(0.026)	(0.022)	(0.022)	(0.022)	(0.026)
Log opioids per capita	6.342		−0.023***	−0.015***	−0.010***	−0.009**	−0.009***	
by county	[0.430]		(0.005)	(0.005)	(0.003)	(0.004)	(0.003)	
Log opioids × period 2	3.245			−0.016***	−0.010***	−0.010***	−0.011***	−0.013***
	[3.186]			(0.004)	(0.003)	(0.003)	(0.003)	(0.004)
Race[b]								
African American	0.119				−0.061***	−0.059***	−0.058***	−0.057***
	[0.324]				(0.004)	(0.004)	(0.004)	(0.004)
Other	0.078				−0.037***	−0.034***	−0.033***	−0.034***
	[0.268]				(0.003)	(0.003)	(0.003)	(0.003)
Hispanic	0.160				0.035***	0.038***	0.038***	0.042***
	[0.367]				(0.003)	(0.003)	(0.003)	(0.003)
Marital status[c]								
Married	0.597				0.086***	0.086***	0.086***	0.085***
	[0.491]				(0.002)	(0.002)	(0.002)	(0.002)
Age	39.391				0.012***	0.012***	0.012***	0.012***
	[8.558]				(0.001)	(0.001)	(0.001)	(0.001)
Age^2/1,000	1.625				−0.186***	−0.186***	−0.187***	−0.184***
	[0.678]				(0.009)	(0.009)	(0.009)	(0.009)
Years of education	13.570				0.013***	0.013***	0.013***	0.012***
	[3.083]				(0.001)	(0.001)	(0.001)	(0.001)
Share manufacturing	0.140						0.090***	
(1999–2001)	[0.048]						(0.033)	
Share manufacturing	0.071						−0.008	0.010
× period 2	[0.077]						(0.031)	(0.037)

Region[d]

Mid-Atlantic	0.135				−0.009	−0.006	
	[0.341]				(0.006)	(0.005)	
East North Central	0.153				0.007	0.003	
	[0.360]				(0.004)	(0.004)	
West North Central	0.068				0.018***	0.018***	
	[0.251]				(0.004)	(0.004)	
South Atlantic	0.189				0.000	0.003	
	[0.391]				(0.005)	(0.004)	
East South Central	0.057				−0.019*	−0.021**	
	[0.232]				(0.010)	(0.010)	
West South Central	0.115				−0.001	0.002	
	[0.319]				(0.006)	(0.006)	
Mountain	0.067				0.003	0.009	
	[0.250]				(0.006)	(0.005)	
Pacific	0.168				−0.008*	−0.007	
	[0.374]				(0.004)	(0.004)	
County fixed effects[e]	No	No	No	No	No	No	Yes
Adjusted R^2	0.003	0.001	0.004	0.055	0.056	0.056	0.063
No. of observations	1,824,890	1,824,890	1,824,890	1,810,246	1,810,246	1,788,508	1,788,508

Sources: U.S. Bureau of Labor Statistics, Current Population Survey; Centers for Disease Control and Prevention, QuintilesIMS (IQVIA); author's calculations.

a. The sample is pooled over 1999–2001 and 2014–16 for men age 25–54. The mean of the dependent variable is 0.900. The regressions are weighted using the Current Population Survey's final weights. Robust standard errors clustered by county or state are in parentheses. Statistical significance is indicated at the ***1 percent, **5 percent, and *10 percent levels.

b. The omitted category is "White."

c. The omitted category is "Single."

d. The omitted category is "New England."

e. County refers to county, metropolitan area, or state, whichever is the smallest available aggregation. See note 39 in the text.

Table 14. Linear Probability Models for Labor Force Participation of Women Age 25–54[a]

	Mean [SD]	(1)	(2)	(3)	(4)	(5)	(6)	(7)
		— Participated in the labor force						
Period 2 dummy (2014–16)	0.510 [0.500]	–0.025*** (0.003)		0.087** (0.037)	0.055* (0.030)	0.047 (0.031)	0.048 (0.031)	0.058* (0.035)
Log opioids per capita by county	6.345 [0.431]		0.002 (0.010)	0.011 (0.011)	0.006 (0.007)	0.011** (0.006)	0.010* (0.005)	
Log opioids × period 2	3.241 [3.187]			–0.018*** (0.006)	–0.016*** (0.005)	–0.014*** (0.005)	–0.014*** (0.005)	–0.015*** (0.005)
Race[b]								
African American	0.139 [0.345]				0.003 (0.005)	0.009 (0.005)	0.009 (0.005)	0.016*** (0.005)
Other	0.082 [0.275]				–0.067*** (0.007)	–0.061*** (0.007)	–0.061*** (0.007)	–0.061*** (0.006)
Hispanic	0.149 [0.356]				–0.033*** (0.005)	–0.024*** (0.004)	–0.024*** (0.004)	–0.015*** (0.004)
Marital status[c]								
Married	0.601 [0.490]				–0.086*** (0.005)	–0.086*** (0.005)	–0.086*** (0.005)	–0.087*** (0.005)
Age	39.480 [8.552]				0.012*** (0.001)	0.012*** (0.001)	0.012*** (0.001)	0.012*** (0.001)
Age^2/1,000	1.632 [0.679]				–0.149*** (0.014)	–0.149*** (0.014)	–0.148*** (0.014)	–0.148*** (0.015)
Years of education	13.746 [2.987]				0.028*** (0.001)	0.028*** (0.001)	0.028*** (0.001)	0.028*** (0.001)
Share manufacturing (1999–2001)	0.139 [0.048]						0.059 (0.053)	
Share manufacturing × period 2	0.071 [0.077]						–0.043 (0.054)	–0.044 (0.051)

Region[d]

Mid-Atlantic	0.137					–0.039***	–0.038***
	[0.344]					(0.007)	(0.007)
East North Central	0.152					–0.007	–0.009
	[0.359]					(0.008)	(0.008)
West North Central	0.065					0.043***	0.043***
	[0.247]					(0.008)	(0.008)
South Atlantic	0.193					–0.021***	–0.020***
	[0.395]					(0.005)	(0.006)
East South Central	0.059					–0.055***	–0.055***
	[0.236]					(0.006)	(0.006)
West South Central	0.114					–0.035***	–0.033***
	[0.318]					(0.007)	(0.007)
Mountain	0.065					–0.026***	–0.023***
	[0.247]					(0.008)	(0.008)
Pacific	0.166					–0.032***	–0.032***
	[0.372]					(0.006)	(0.006)
County fixed effects[e]	No	No	No	No	No	No	Yes
Adjusted R^2	0.001	0.000	0.001	0.049	0.052	0.052	0.057
No. of observations	1,962,822	1,962,822	1,962,822	1,947,471	1,947,471	1,924,732	1,924,732

Sources: U.S. Bureau of Labor Statistics, Current Population Survey; Centers for Disease Control and Prevention, QuintilesIMS (IQVIA); author's calculations.

a. The sample is pooled over 1999–2001 and 2014–16 for women age 25–54. The mean of the dependent variable is 0.755. The regressions are weighted using the Current Population Survey's final weights. Robust standard errors clustered by county or state are in parentheses. Statistical significance is indicated at the ***1 percent, **5 percent, and *10 percent levels.

b. The omitted category is "White."

c. The omitted category is "Single."

d. The omitted category is "New England."

e. County refers to county, metropolitan area, or state, whichever is the smallest-available aggregation. See note 39 in the text.

sample and controlling for self-reported health, the county-level opioid prescription rate has a similar effect as in the the regression using the larger basic monthly CPS data. It is also worth noting that Jessica Laird and Torben Nielsen (2016), using arguably exogenous variation in physicians' practices stemming from geographic mobility across municipalities, find a significant and sizable negative effect of the opioid prescription rate—but not other medications—on labor force participation in Denmark.[41] In the United States, however, it is possible that other confounding factors are influencing both opioid usage and low labor force participation.

These findings are preliminary and highly speculative. A useful extension of this analysis would be to determine whether higher prescription rates are associated with depressed flows of workers from outside the labor force back into the labor force, or with greater labor force exit rates. In addition, future research could seek to identify the sources of exogenous variability in prescription rates, or in treatment for opioid addiction, to estimate the causal effect of opioid medication on labor force participation.

V. Conclusion

The decline in labor force participation in the United States over the past two decades is a macroeconomic problem and a social concern. Along with several other studies, this paper finds that declining labor force participation since 2007 is largely the result of an aging population and ongoing trends that preceded the Great Recession, such as increased school enrollment.

Given ongoing downward pressure on labor force participation from an expected wave of retirements among members of the baby boom generation in coming decades, a reversal in the aggregate slide in labor force participation will require a change in secular trends affecting various demographic groups, and perhaps a major reform in immigration policy. There are a few demographic groups that may be more susceptible to a rise in labor force participation than others. First, older workers may increasingly delay retirement, bolstering their rise in labor force participation that has occurred over the past two decades. This trend may not continue for older women,

---

41. Although it is difficult to compare the magnitudes of the estimates that Laird and Nielsen find with those reported here, because Laird and Nielsen focus on opioid prescription rates (rather than the amount of opioids prescribed per capita), their estimates imply large labor force effects that appear substantially larger than those reported here. They find that an increase of 10 percentage points in a doctor's prescription rate, which is roughly a 50 percent increase from the current U.S. average, is associated with a decline of 1.5 percentage points in the labor force participation rate.

however, as a cross-cohort analysis shows that labor force participation stopped rising for cohorts that are about to enter their late 50s and 60s.

Second, the labor force participation rate of women age 25–44 has been edging down for two decades, unlike their counterparts in Canada. Although NLF women who report "home responsibilities" as their main reason for not working appear satisfied with their lives, the group of women who are out of the labor force mainly for other reasons report low levels of life satisfaction and high levels of emotional distress. More generous vacation time and workplace flexibility provided by private company policies and supported by government policies could possibly help reverse the decline in labor force participation by prime age women. Corporate and government policies that promote equal pay and the advancement of working women to supervisory and managerial positions, as well as a more robust economic recovery, may also facilitate such a reversal.

Third, addressing the decades-long slide in labor force participation by prime age men should be a national priority. Prime age men express low levels of SWB and report finding relatively little meaning in their daily activities. Because nearly half this group reported being in poor health, it may be possible for expanded health insurance coverage and preventive care under the Affordable Care Act to positively affect the health of prime age men. The finding that nearly half of prime age, NLF men take pain medication on any given day and that 40 percent report that pain prevents them from accepting a job suggests that pain management interventions could potentially be helpful.

The evidence presented here suggests that much of the regional variation in opioid prescription rates across the United States is due to differences in medical practices, rather than varying health conditions that generate pain. Furthermore, labor force participation is lower and fell more in the 2000s in areas of the United States that have a higher volume of opioid medication prescribed per capita than in other areas. Although some obvious suspects can be ruled out—for example, areas with high opioid prescription rates do not appear to be only masking historical manufacturing strongholds that subsequently fell on hard times—it is unclear whether other factors underlying low labor force participation could have caused the high prescription rates of opioids in certain counties. Regardless of the direction of causality, the opioid crisis and depressed labor force participation are now intertwined in many parts of the United States. And despite the massive rise in opioid prescriptions in the 2000s, there is no evidence that the incidence of pain has declined; in fact, the results presented here suggest a small upward trend in the incidence of pain for prime age, NLF and unemployed men.

Addressing the opioid crisis could help support efforts to raise labor force participation and prevent it from falling further.

Finally, several studies have found that the rise in inequality and shift in demand against less skilled workers in the United States are linked to the decline in labor force participation. Although labor market shifts that have lowered demand and wages for less skilled workers have not been a focus of this paper, policies that raise after-tax wages for low-wage workers, such as an increase in the minimum wage or expansion of the Earned Income Tax Credit, would also likely help raise labor force participation. The enormous rise in incarceration from the 1980s to the mid-2000s and the consequent rise in the number of men with criminal records are also likely factors that have exacerbated the decline in male labor force participation and that could be addressed to reverse the trend.

References

Aaronson, Stephanie, Tomaz Cajner, Bruce Fallick, Felix Galbis-Reig, Christopher Smith, and William Wascher. 2014. "Labor Force Participation: Recent Developments and Future Prospects." *Brookings Papers on Economic Activity*, Fall: 197–255.

Aaronson, Stephanie, Bruce Fallick, Andrew Figura, Jonathan Pingle, and William Wascher. 2006. "The Recent Decline in the Labor Force Participation Rate and Its Implications for Potential Labor Supply." *Brookings Papers on Economic Activity*, Spring: 69–134.

Abraham, Katharine G., and Melissa S. Kearney. 2018. "Explaining the Decline in the U.S. Employment-to-Population Ratio: A Review of the Evidence." Working Paper no. 24333. Cambridge, Mass.: National Bureau of Economic Research.

Aguiar, Mark, Mark Bils, Kerwin Kofi Charles, and Erik Hurst. 2017. "Leisure Luxuries and the Labor Supply of Young Men." Working Paper no. 23552. Cambridge, Mass.: National Bureau of Economic Research.

Autor, David H., David Dorn, and Gordon H. Hanson. 2013. "The China Syndrome: Local Labor Market Effects of Import Competition in the United States." *American Economic Review* 103, no. 6: 2121–68.

Blau, Francine D., and Lawrence M. Kahn. 2013. "Female Labor Supply: Why Is the United States Falling Behind?" *American Economic Review* 103, no. 3: 251–56.

BLS (Bureau of Labor Statistics). 2013. "Persons with a Disability: Barriers to Employment, Types of Assistance, and Other Labor-Related Issues—May 2012." Technical Note. Washington: U.S. Department of Labor. https://www.bls.gov/news.release/dissup.tn.htm

Bound, John. 1989. "The Health and Earnings of Rejected Disability Insurance Applicants." *American Economic Review* 79, no. 3: 482–503.

Case, Anne, and Angus Deaton. 2015. "Rising Morbidity and Mortality in Midlife among White Non-Hispanic Americans in the 21st Century." *Proceedings of the National Academy of Sciences* 112, no. 49: 15078–83.

———. 2017. "Mortality and Morbidity in the 21st Century." *Brookings Papers on Economic Activity*, Spring: 397–443.

CEA (Council of Economic Advisers). 2007. *Economic Report of the President*. Washington: U.S. Government Printing Office.

———. 2014. "The Labor Force Participation Rate since 2007: Causes and Policy Implications." Report. Washington: White House. https://obamawhitehouse.archives.gov/sites/default/files/docs/labor_force_participation_report.pdf

———. 2016. "The Long-Term Decline in Prime-Age Male Labor Force Participation." Report. Washington: White House. https://obamawhitehouse.archives.gov/sites/default/files/page/files/20160620_primeage_male_lfp_cea.pdf

Charles, Kerwin Kofi, Erik Hurst, and Matthew J. Notowidigdo. 2016. "The Masking of the Decline in Manufacturing Employment by the Housing Bubble." *Journal of Economic Perspectives* 30, no. 2: 179–200.

———. Forthcoming. "Housing Booms, Manufacturing Decline, and Labor Market Outcomes." *Economic Journal*.

Cheng, Evelyn. 2017. "Goldman Sachs Thinks the Opioid Crisis Is So Bad It's Affecting the Economy." CNBC, July 6.

Coglianese, John. 2016. "Shrinkouts versus Dropouts: Explaining Declines in Labor Force Participation." Working paper. https://scholar.harvard.edu/files/coglianese/files/Coglianese_2016.pdf

Dahl, Gordon B., Katrine V. Løken, Magne Mogstad, and Kari Vea Salvanes. 2016. "What Is the Case for Paid Maternity Leave?" *Review of Economics and Statistics* 98, no. 4: 655–70.

Doctor, Jason, and Michael Menchine. 2017. "Tackling the Opioid Crisis with Compassion: New Ways to Reduce Use and Treatment." Blog post, March 20, Schaeffer Initiative for Innovation in Health Policy, Washington.

Drolet, Marie, Sharanjit Uppal, and Sébastien LaRochelle-Côté. 2016. "The Canada–U.S. Gap in Women's Labour Market Participation." Insights on Canadian Society. Ottawa: Statistics Canada.

Eberstadt, Nicholas. 2016. "The Idle Army: America's Unworking Men." *Wall Street Journal*, September 1.

Fernald, John G., Robert E. Hall, James H. Stock, and Mark W. Watson. 2017. "The Disappointing Recovery of Output after 2009." *Brookings Papers on Economic Activity*, Spring: 1–58.

Fox, Maggie. 2017. "Lots of Americans Prescribed Opioids, Insurance Survey Shows." NBC News, June 29.

Frieden, Thomas R., and Debra Houry. 2016. "Reducing the Risks of Relief—The CDC Opioid-Prescribing Guideline." *New England Journal of Medicine* 374, no. 16: 1501–04.

Goldin, Claudia D. 1991. "The Role of World War II in the Rise of Women's Employment." *American Economic Review* 81, no. 4: 741–56.

Goldin, Claudia, and Joshua Mitchell. 2017. "The New Life Cycle of Women's Employment: Disappearing Humps, Sagging Middles, Expanding Tops." *Journal of Economic Perspectives* 31, no. 1: 161–82.

Juhn, Chinhui, Kevin M. Murphy, and Robert H. Topel. 1991. "Why Has the Natural Rate of Unemployment Increased over Time?" *Brookings Papers on Economic Activity*, no. 1: 75–126.

———. 2002. "Current Unemployment, Historically Contemplated." *Brookings Papers on Economic Activity*, no. 1: 79–116.

Juhn, Chinhui, and Simon Potter. 2006. "Changes in Labor Force Participation in the United States." *Journal of Economic Perspectives* 20, no. 3: 27–46.

Kahneman, Daniel, and Angus Deaton. 2010. "High Income Improves Evaluation of Life but Not Emotional Well-Being." *Proceedings of the National Academy of Sciences* 107, no. 38: 16489–93.

Kahneman, Daniel, and Alan B. Krueger. 2006. "Developments in the Measurement of Subjective Well-Being." *Journal of Economic Perspectives* 20, no. 1: 3–24.

Krause, Eleanor, and Isabel Sawhill. 2017. "What We Know and Don't Know about Declining Labor Force Participation: A Review." Report. Brookings, Center on Children and Families.

Krueger, Alan B., Judd Cramer, and David Cho. 2014. "Are the Long-Term Unemployed on the Margins of the Labor Market?" *Brookings Papers on Economic Activity*, Spring: 229–80.

Krueger, Alan B., Daniel Kahneman, David Schkade, Norbert Schwarz, and Arthur A. Stone. 2009. "National Time Accounting: The Currency of Life." In *Measuring the Subjective Well-Being of Nations: National Accounts of Time Use and Well-Being*, edited by Alan B. Krueger. University of Chicago Press.

Krueger, Alan B., and Arthur A. Stone. 2008. "Assessment of Pain: A Community-Based Diary Survey in the USA." *The Lancet* 371, no. 9623: 1519–25.

Laird, Jessica, and Torben Nielsen. 2016. "The Effects of Physician Prescribing Behaviors on Prescription Drug Use and Labor Supply: Evidence from Movers in Denmark." Job market paper. http://scholar.harvard.edu/files/lairdja/files/Laird_JMP.pdf

Lysy, Frank J. 2016. "The Structural Factors behind the Steady Fall in Labor Force Participation Rates of Prime Age Workers." Blog post, October 14. https://aneconomicsense.org/2016/10/14/the-structural-factors-behind-the-steady-fall-in-labor-force-participation-rates-of-prime-age-workers/

Moffitt, Robert A. 2012. "The Reversal of the Employment–Population Ratio in the 2000s: Facts and Explanations." *Brookings Papers on Economic Activity*, Fall: 201–50.

Morden, Nancy E., Jeffrey C. Munson, Carrie H. Colla, Jonathan S. Skinner, Julie P. W. Bynum, Weiping Zhou, and Ellen Meara. 2014. "Prescription Opioid Use among Disabled Medicare Beneficiaries: Intensity, Trends, and Regional Variation." *Medical Care* 52, no. 9: 852–59.

Parsons, Donald O. 1980. "The Decline in Male Labor Force Participation." *Journal of Political Economy* 88, no. 1: 117–34.

Satel, Sally. 2017. "Taking On the Scourge of Opioids." *National Affairs* 32: 3–21.

Schnell, Molly, and Janet Currie. 2017. "Addressing the Opioid Epidemic: Is There a Role for Physician Education?" Working Paper no. 23645. Cambridge, Mass.: National Bureau of Economic Research.

Social Security Administration. 2017. "Disability Benefits." Publication no. 05-10029. Woodlawn, Md. https://www.ssa.gov/pubs/EN-05-10029.pdf

Vance, J. D. 2016. *Hillbilly Elegy: A Memoir of a Family and Culture in Crisis*. New York: HarperCollins.

von Wachter, Till, Jae Song, and Joyce Manchester. 2011. "Trends in Employment and Earnings of Allowed and Rejected Applicants to the Social Security Disability Insurance Program." *American Economic Review* 101, no. 7: 3308–29.

Comments and Discussion

COMMENT BY

LAWRENCE F. KATZ
Alan Krueger has produced an extremely informative and insightful analysis of the decline of the U.S. labor force participation rate of recent decades, with an emphasis on the post-2007 period. He carefully shows that the vast majority of the 2.8 percentage point decline in the overall U.S. labor force participation rate—from 65.6 percent in 2007 to 62.8 percent in the first half of 2017—can be accounted for by demographic shifts driven by population aging to groups with lower labor force participation. Krueger concludes that the remainder of the decline in the participation rates since 2007 reflects trends by demographic group that precede the Great Recession, with no lingering effects of the Great Recession still present by 2017. Prime age male labor force participation has been declining for decades, but the slight decline in the prime age female participation rate since the late 1990s reflects a sharp break from rapidly rising participation across cohorts for women born before 1960.

Krueger's most innovative contribution (in addition to his important new data collection efforts) involves a comprehensive examination of the health status, use of pain medication, and subjective well-being of individuals who are not in the labor force in comparison with those in the labor force. He finds that about half of prime age men not in the labor force are in pain, have serious health conditions, and take pain medications. Prime age men not in the labor force also report notably low subjective and emotional well-being, as do women not in the labor force who do not cite "home responsibilities" as the main reason for being out of the labor force. Krueger also provides striking evidence that the depressed labor force participation rate for prime age workers and the opioid addiction crisis are closely intertwined. He finds a strong partial correlation across U.S. counties in the decline in the prime age (male and female) labor force participation rate in

the 2000s with the opioid pain medication prescription rate. Furthermore, he shows that young men have modestly shifted their time use from work to video games and computer activities, in which they report being happy but deriving little meaning.

Krueger's collage of evidence is impressive and convincing. But I would like to raise some quibbles with a couple of his main takeaways. The first is his conclusion that the effects of the Great Recession with respect to labor force participation are now over. The much larger decline in the labor force participation rate for prime age men from 2007 to 2017 as compared with 1997 to 2007, seen in Krueger's table 1, suggests persistent depressing effects of the Great Recession on labor force participation beyond preexisting trends. For example, the labor force participation rate for men age 25–34 declined by 3.3 percentage points in the last decade, as compared with just 0.7 percentage point from the previous decade. Also, Danny Yagan (2017) presents compelling evidence that geographic areas (states and commuting zones) with larger adverse Great Recession shocks show full recovery in their unemployment rates by 2015 but not in their labor force participation rates—unlike in previous recessions, when local labor force participation rates tended to fully recover in about six to seven years (Blanchard and Katz 1992). Yagan (2017) further shows persistent effects of larger local Great Recession shocks on the employment of working age adults through (at least) 2015, even when examining individuals matched on demographics, with similar wages, and working for the same national employers before the Great Recession. Thus, the effects of the Great Recession may not be fully over in 2017, and hysteresis effects from the Great Recession may explain a part of the lack of recovery in the labor force participation rate in the current recovery beyond preexisting trends, especially for prime age men.

The second key issue concerns whether one can provide a causal interpretation of the negative relationship between local area opioid prescription rates and changes in prime age labor force participation. Krueger shows that the negative correlation of opioid prescription and labor force participation remains with controls for the manufacturing employment share and broad health status measures. He makes the case that there is a lot of geographic variation in physician practice styles that could lead to much of the observed local variation in opioid prescription rates. Still, one worries that omitted variables—such as the preexisting local share of employment in more pain-intensive industries and occupations (routine jobs with more repetitive physical and mental tasks)—could drive both local employment declines (from technological and trade shocks reducing labor demand in

routine pain-intensive jobs) and be associated with high opioid prescription rates, even conditional on the manufacturing share.

Future research needs to probe the opioid prescription causal arrow by more fully trying to exploit more plausibly exogenous variation in local area opioid prescription rates, such as direct measures of physician practice style and medical training variation. Jessica Laird and Torben Nielsen (2016) offer supporting quasi-experimental evidence for Krueger's hypothesis using variation in individual-level opioid prescriptions from patients' geographic moves that lead to changes in primary care physicians with different drug prescribing rates. Laird and Nielsen (2016) find that physicians with higher opioid prescription rates lead to lower future labor earnings and labor force participation rates for their patients; but similar effects are not found for other types of drugs (such as anti-inflammatories or antianxiety drugs).

I next explore additional explanations for the decline in the U.S. labor force participation rate. A distinctive factor in declining male labor force participation that seems less nefarious than health and drug addiction problems has been a substantial rise of "in-and-outs" (those who take temporary labor force breaks and move in and out of the labor force within a year), as documented by John Coglianese (2017). The growth of in-and-outs accounts for about one-third of the decline in the prime age male labor force participation rate since the 1970s. The in-and-outs do not have the same health and pain medication addiction issues as permanent labor force dropouts. Coglianese (2017) shows that much of the increased incidence of in-and-out behavior seems to be related to breaks between jobs being made feasible by higher spousal (partner) income, with a larger rise for demographic and regional groups of men with greater increases in partner wages.

The decline in the labor force participation rate for prime age men has been much greater for less educated men than for college graduates. My table 1 further shows the decline in labor force participation has been steeper for men in the bottom three quintiles of the (predicted) wage distribution—the groups who have experienced real wage declines since 1980. The fall in employment of non–college educated men and lower-wage men in recent decades corresponds to strong shifts in labor demand against less-skilled workers, rising wage inequality and educational wage differentials, declining real earnings for less-educated men, and a shift in demand toward social and interactive skills in the labor market (Autor 2014; Deming 2017).

Table 1. Labor Force Participation and Real Wages for Prime Age Men, 1980–2015

Wage quintile	Change in labor force participation rate[a]	Change in real wages[b]	Labor supply partial elasticity[c]	Predicted change in labor force participation rate[d]
1	−12.7	−5.0	0.25	−13.8
2	−6.2	−6.6	0.15	−8.5
3	−5.8	−1.2	0.06	−3.1
4	−2.4	14.3	0.06	−2.2
5	−1.8	45.4	0.06	−0.3

Sources: Coglianese (2017); Current Population Survey, Outgoing Rotation Group; Juhn, Murphy, and Topel (1991); Economic Policy Institute, State of Working America Data Library; author's calculations.

a. The units are percentage points. The change in the labor force participation rate is constructed based on the merged Outgoing Rotation Group data from Coglianese (2017).

b. The units are $100 \times$ natural log points. The change in real wages is constructed based on the merged Outgoing Rotation Group data from Coglianese (2017). The approach of Juhn, Murphy, and Topel (1991) for wage quintiles is used to impute wages for labor force dropouts: Those with no employment history in any observed month are imputed using respondents who report working 1 to 2 months with similar observables. Wages are deflated by the personal consumption expenditures chain-type price index.

c. Labor supply partial elasticity is the cross-sectional estimate from table 9 of Juhn, Murphy, and Topel (1991).

d. The units are percentage points. The predicted change in labor force participation is the product of the difference between productivity growth (defined as the growth in net output per hour) from 1980 to 2015 (0.502 natural log point) and the change in real wages and the labor supply partial elasticity.

The real wages (compensation) for non–college educated men (and for production and nonsupervisory workers more generally) kept pace with productivity growth from 1947 to 1973, but have substantially lagged productivity growth for the past four decades. If, as seems plausible, the reservation wage (the value of leisure and benefits) of non–college educated men rises (at least partially) with overall productivity growth in the economy, even as their own real wages have stagnated, then a larger fraction will have reservation wages above their own wage opportunities. Thus, one will tend to see a declining labor force participation rate for groups whose wages do not keep up with productivity growth. In fact, the decline in the prime age male labor force participation rate was much more modest (0.06 percentage point a year) during the period when wages kept pace with productivity, from 1947 to 1973, than it was from 1973 to 2016, when it fell by 0.16 percentage point a year, as real wages for typical (production and nonsupervisory workers) stagnated but productivity continued growing fairly rapidly.

What would have happened to the prime age male labor force participation rate if real wage growth in all quintiles had kept up with labor productivity growth in the post-1980 period? Productivity (as measured by

net output per hour) increased by 50 natural log points from 1980 to 2015 (Economic Policy Institute 2017). The final column of my table 1 explores the predicted change in prime age male labor force participation from the gap between actual real wage growth and labor productivity growth from 1980 to 2015 by wage quintile, using the partial labor supply elasticities from the classic study by Chinhui Juhn, Kevin Murphy, and Robert Topel (1991). The implication of my table 1 is that the poor wage performance relative to productivity growth can more than fully explain the post-1980 decline in labor force participation of the bottom two quintiles of prime age men if their labor supply is as elastic as the historical cross-sectional estimates of Juhn, Murphy, and Topel (1991).

Recent experimental evidence from the Paycheck Plus expansion of the Earned Income Tax Credit for low-wage, childless workers suggests a lower labor supply elasticity for low-wage men, with a 0.7 percentage point employment rate increase for about an 11 percent wage increase— suggesting a partial labor supply elasticity of more like 0.06 (Miller and others 2017). Even such a lower labor supply elasticity would imply that about one quarter of the labor force participation decline for low-wage males could be explained by poor wage performance relative to productivity growth. But the Paycheck Plus estimate cannot rule out larger labor supply elasticities more similar to those of Juhn, Murphy, and Topel (1991), and could be an underestimate, to the extent the value of the Earned Income Tax Credit expansion was not salient to many participants. The modest employment response in the Paycheck Plus experiment could also reflect rationing in the labor market for men with criminal records and other barriers to employment.

The Council of Economic Advisers (2016), using state panel data for 1977–2016, uncovers a positive relationship between prime age male labor force participation and wages at the 10th and 25th percentiles, and a negative relationship with inequality in models with state and year fixed effects. Robert Moffitt (2012) and Katharine Abraham and Melissa Kearney (2018) similarly find a substantial contribution of real wage stagnation and demand-side factors (poor employment opportunities) in the declining prime age male employment-to-population ratio.

Another possible contributing factor to the decline in the labor force participation rate is declining geographic mobility and interstate migration. Olivier Blanchard and I (1992) show that adjustments to U.S. local economic shocks from 1947 to 1990 largely took place through migration from declining to expanding areas, with the adverse local shocks having only transitory negative effects on the local labor force participation rate.

Mai Dao, Davide Furceri, and Prakash Loungani (2017) find a decline in the interstate migration response to state economic shocks in the past couple of decades. And Peter Ganong and Daniel Shoag (2017) document how declining directed interstate migration rates since 1990 have been related to the rising restrictiveness of land use and housing regulations in high-productivity areas (like the San Francisco Bay Area), reducing housing supply elasticity in potential receiving destinations. More affordable housing in declining areas, along with the greater health problems of job losers documented by Krueger, may be leading more individuals to remain out of the labor force in areas with poor employment prospects rather than move to higher-wage areas with much more expensive housing.

The rise of incarceration rates and the increased reach of the criminal justice system since 1980 are also likely playing an important role in declining employment rates for U.S. men, as emphasized by Nicholas Eberstadt (2017). There has been a large rise in the share of the civilian noninstitutional population who were formerly incarcerated or have a felony record and thus may be "screened out" of employment opportunities. Estimates indicate that the share of the adult male working age population who are former prisoners increased from 1 percent in 1980 to between 6 and 7 percent in 2014, and the share with a past felony conviction increased over the same period, from 4 percent to between 13 and 15 percent (Bucknor and Barber 2016; Shannon and others 2017). Estimates suggesting that a serious criminal record could reduce employment rates by 10 to 20 percent imply that there has been as much as a 1 to 2 percentage point decline in the adult male labor force participation rate since 1980 resulting from the rising share with a felony record. There is likely some connection between the opioid epidemic, which increasingly is linked with heroin (and illegal drugs), and high criminal record rates for nonemployed men. Drug treatment programs, as well as second chance programs for the formerly incarcerated and wage subsidies for public sector or transitional jobs, may be needed to reconnect many prime age men with criminal records to the labor force.

REFERENCES FOR THE KATZ COMMENT

Abraham, Katharine G., and Melissa S. Kearney. 2018. "Explaining the Decline in the U.S. Employment-to-Population Ratio: A Review of the Evidence." Working Paper no. 24333. Cambridge, Mass.: National Bureau of Economic Research.

Autor, David H. 2014. "Skills, Education, and the Rise of Earnings Inequality among the 'Other 99 Percent.'" *Science* 344, no. 6186: 843–51.

Blanchard, Olivier Jean, and Lawrence F. Katz. 1992. "Regional Evolutions." *Brookings Papers on Economic Activity*, no. 1: 1–61.

Bucknor, Cherrie, and Alan Barber. 2016. "The Price We Pay: Economic Costs of Barriers to Employment for Former Prisoners and People Convicted of Felonies." Washington: Center for Economic and Policy Research.

Coglianese, John. 2017. "The Rise of In-and-Outs: Declining Labor Force Participation of Prime Age Men." Job market paper. https://scholar.harvard.edu/coglianese/publications/rise-of-in-and-outs

Council of Economic Advisers. 2016. "The Long-Term Decline in Prime-Age Male Labor Force Participation." Washington: White House. https://obamawhitehouse.archives.gov/sites/default/files/page/files/20160620_cea_primeage_male_lfp.pdf

Dao, Mai, Davide Furceri, and Prakash Loungani. 2017. "Regional Labor Market Adjustment in the United States: Trend and Cycle." *Review of Economics and Statistics* 99, no. 2: 243–57.

Deming, David J. 2017. "The Growing Importance of Social Skills in the Labor Market." *Quarterly Journal of Economics* 132, no. 4: 1593–640.

Eberstadt, Nicholas. 2017. "Where Did All the Men Go? The Rise of the Unworking." *Milken Institute Review*, Quarter 2. http://www.milkenreview.org/articles/where-did-all-the-men-go

Economic Policy Institute. 2017. "Productivity and Hourly Compensation." *State of Working America Data Library*. Washington. http://www.epi.org/data

Ganong, Peter, and Daniel Shoag. 2017. "Why Has Regional Income Convergence in the U.S. Declined?" *Journal of Urban Economics* 102: 76–90.

Juhn, Chinhui, Kevin M. Murphy, and Robert H. Topel. 1991. "Why Has the Natural Rate of Unemployment Increased over Time?" *Brookings Papers on Economic Activity*, no. 2: 75–126.

Laird, Jessica, and Torben Nielsen. 2016. "The Effects of Physician Prescribing Behaviors on Prescription Drug Use and Labor Supply: Evidence from Movers in Denmark." Job market paper. http://scholar.harvard.edu/files/lairdja/files/Laird_JMP.pdf

Miller, Cynthia, Lawrence F. Katz, Gilda Azurdia, Adam Isen, and Caroline Schultz. 2017. "Expanding the Earned Income Tax Credit for Workers without Dependent Children: Interim Findings from the Paycheck Plus Demonstration in New York City." New York: MDRC.

Moffitt, Robert A. 2012. "The Reversal of the Employment–Population Ratio in the 2000s: Facts and Explanations." *Brookings Papers on Economic Activity*, Fall: 201–50.

Shannon, Sarah K. S., Christopher Uggen, Jason Schnittker, Melissa Thompson, Sara Wakefield, and Michael Massoglia. 2017. "The Growth, Scope, and Spatial Distribution of People with Felony Records in the United States, 1948 to 2010." *Demography* 54, no. 5: 1795–818.

Yagan, Danny. 2017. "Employment Hysteresis from the Great Recession." Working Paper no. 23844. Cambridge, Mass.: National Bureau of Economic Research.

COMMENT BY

MATTHEW J. NOTOWIDIGDO[1]   This creative and impressively thorough paper by Alan Krueger makes several useful contributions: First, the paper provides a new decomposition of recent trends in aggregate labor force participation (LFP), which provides a useful road map for future work and may also provide guidance as a forecasting tool. Second, the paper highlights the differences in LFP trends across different demographic groups, emphasizing that many groups have been evolving differently for different reasons. Put simply, there is no Grand Unified Theory of LFP trends across different demographic groups. Third, the paper provides initial evidence on the role of pain medication and physical barriers to work in affecting LFP of prime age men in recent years. The county-level regression results relating changes in LFP to a per capita measure of opioid prescriptions are fascinating and will surely stimulate much more work trying to explain the labor market consequences of this tragic health care crisis.

My discussion focuses on three areas. In the next section, I briefly comment on the decomposition exercise. I then turn to discussing some of my own recent work on health-related barriers to work, which I think complements and reinforces some of Krueger's new results. Finally, I discuss and extend some of the findings on female LFP, comparing life-cycle LFP patterns across birth cohorts in the United States and Canada.

DECOMPOSITION EXERCISE Krueger carries out a straightforward decomposition of aggregate trends in LFP. One useful aspect of this particular decomposition is that it separately shows the importance of ongoing changes in demographic composition and the role of secular trends in LFP within narrowly defined demographic groups. The focus on within-group secular trends distinguishes this work from a related decomposition exercise done by Katharine Abraham and Melissa Kearney (2018). Also distinct from this recent related work is the focus on groups defined by age and gender, as opposed to defining groups more narrowly using additional demographic information, such as level of education. As a result, skill-biased labor demand shifts that affect individuals with different levels of education differently are likely to contribute to some of the observed difference in LFP trends across demographic groups.

Several recent papers provide useful starting points for thinking about the sources of some of these differences in LFP trends across groups. The already-classic work by David Autor, David Dorn, and Gordon Hanson (2013) emphasizes the importance of the "China shock" that started in about 2000. Work by Autor and Dorn (2013) emphasizes technological progress that has accelerated the automation of routine jobs. More recently, Daron Acemoglu and Pascual Restrepo (2017) have studied the direct replacement of workers by robots. All these factors affect workers at different skill levels differently, and thus can account for some of the differences in LFP trends across groups.

Krueger shows that recent trends in aggregate LFP can be largely accounted for by a combination of changes in demographic composition and linearly extrapolating group-specific LFP trends between 1997 to 2006.[2] In other words, there may not be a very large role for deviations from preexisting group-specific trends during and after the Great Recession in explaining medium-run trends in LFP. This suggests to me that aggregate LFP today relative to the mid-2000s largely reflects structural forces rather than cyclical forces, which is consistent with the "headwinds" highlighted by my colleague Robert Gordon in his recent book (Gordon 2016).

HEALTH-RELATED BARRIERS TO WORK AND THE ROLE OF PAIN MEDICATION In studying the role of paid medication on prime age male LFP, I interpret Krueger's paper as having in mind the following causal chain: Individuals experience "health shocks," which lead to pain and the prescription of pain medications; this in turn reduces the labor supply, both because of the direct effect of the health shock and the indirect effect of the health shock–induced dependence on, or abuse of, prescription pain medication. In other words, pain medication has the potential to *exacerbate* the adverse effects of health shocks on the labor supply, above and beyond what one might expect from decreases in labor market productivity and increases in the disutility of work caused by adverse health shocks.

2. I think using a 1997–2006 trend for extrapolation is reasonable, but one may be concerned that this will overstate preexisting secular trends if LFP was artificially high during the most recent housing boom. In this case, employment of some demographic groups may be especially high toward the end of this period, when the national housing boom was strongest, and this may have masked the underlying secular trends in employment for some groups. I have studied this masking in several papers written with Erik Hurst and Kerwin Charles, and we find evidence of significant masking during the housing boom period for men and women without a college education (Charles, Hurst, and Notowidigdo 2016, 2017).

This is an intuitive and plausible hypothesis, but of course one could also construct an alternative hypothesis that emphasized the ability of pain medications to manage pain and enable individuals to return to the labor market. For example, in the absence of access to prescription pain medication, it could be harder for individuals to return to work after an adverse health shock. Ultimately, this would appear to be an empirical question, and I view the empirical specifications in Krueger's paper as estimating a kind of "net effect" of opioid prescriptions, which tells us something about whether opioids do more harm than good when it comes to enabling individuals to overcome adverse health shocks and return to work.

There is an obvious reverse causality concern, which is that job displacements and other adverse labor market shocks can lead to drug abuse, with some of the drug abuse potentially involving prescription pain medications. This would lead to a negative correlation between pain medications per capita and LFP, but the causality would be running in the other direction. Some recent work supports this alternative story. Justin Pierce and Peter Schott (2016) study the relationship between trade liberalization and mortality from suicide, poisonings (which include drug overdoses), and alcohol-related liver disease. They interpret their results as suggesting that counties that were more exposed to trade liberalization experienced declines in manufacturing employment, which in turn led to increased mortality. Similarly, Autor, Dorn, and Hanson (2013) find evidence that the China shock negatively affected local employment opportunities for young men, which in turn increased male mortality from drug abuse and alcohol abuse.

Krueger fully recognizes this reverse causality concern, and does a number of useful things to try to address it head-on. I find the specifications, which include county fixed effects and controls related to manufacturing decline (including directly controlling for the China shock), to be particularly compelling. I think the fact that the main results are robust to these additional controls addresses some of the most obvious threats to validity.

Returning to the original causal chain described at the start of this section, I think that my own recent work with Carlos Dobkin, Amy Finkelstein, and Raymond Kluender can provide a useful complement to this work (Dobkin and others 2018). In this work, we study some of the economic consequences of hospital admissions, which serve as our proxy for a health shock. We study a large number of outcomes, including out-of-pocket medical spending, labor market outcomes (such as income, employment, and retirement), unpaid bills, bankruptcy, access to credit, and borrowing. Our work uses an event study approach, which allows us to provide visual

Figure 1. The Effect of Hospital Admission on Earnings[a]

Thousands of dollars

Survey wave, relative to hospitalization
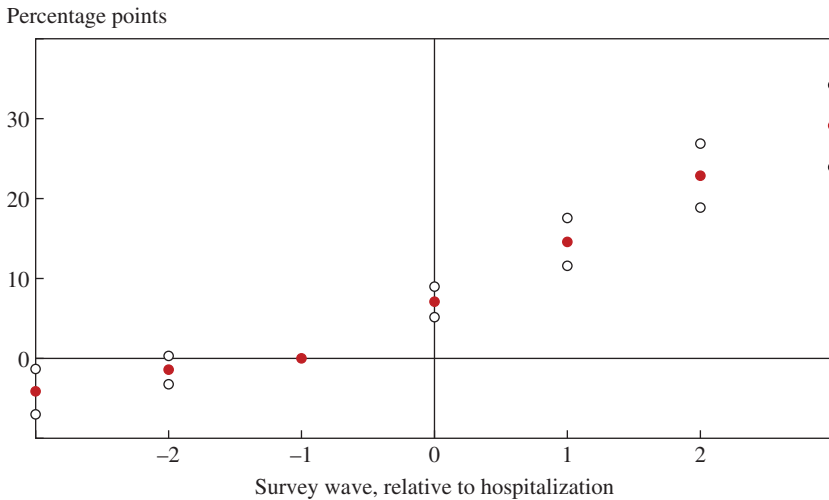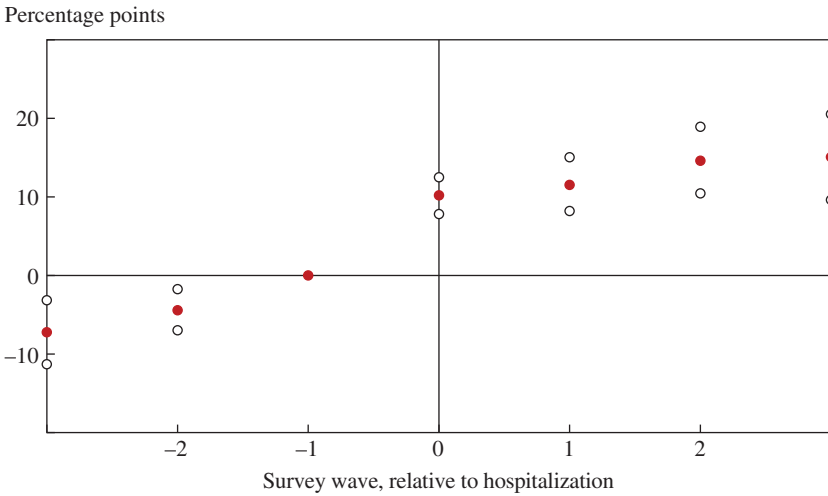
Sources: Dobkin and others (2018); author's calculations.

a. This figure shows the change in labor market earnings after hospitalization, based on an event study using ordinary least squares regression. The sample includes people age 50–59 who are insured at the time of hospital admission. Survey waves are biannual, so we assume that hospitalization occurs on average halfway between survey waves. The survey wave that reports the hospitalization is normalized to 0. The hollow circles indicate 95 percent confidence intervals. All estimates are weighted using survey weights. The prehospitalization mean is $45,327.

evidence of the "on impact" effects of hospitalizations on each of the main outcomes. We study the labor market effects of hospital admissions using 20 years of Health and Retirement Study (HRS) data, and we focus on individuals who were hospitalized between age 50 and 59.[3]

Overall, we find substantial declines in earnings and income in the HRS data after a hospital admission. Three years after hospital admission, the adults in our sample experienced an 11 percentage point (15 percent) decline in the probability of being employed, and an average annual decline in labor market earnings of roughly $9,000 (20 percent of earnings before hospital admission). These results are reproduced in my figures 1 and 2.[4] The figures report event study estimates for each survey wave before and after the index hospital admission (that is, the first hospital admission we

3. I extend the analysis sample from Dobkin and others (2018) by adding a new variable for prescription drug use. The variable is an indicator based on whether the respondent reports regularly taking prescription medications.

4. The full details of the construction of the sample and the specifications used to generate these figures is given in Dobkin and others (2018).

Figure 2. The Effect of Hospital Admission on Full-Time Employment[a]

Percentage points

Survey wave, relative to hospitalization

Sources: Dobkin and others (2018); author's calculations.

a. This figure shows the change in the probability of being employed after hospitalization, based on an event study using ordinary least squares regression. The dependent variable is defined to be 100 if the individual is working full time, and 0 otherwise. See the notes to figure 1. The prehospitalization mean is 66.5 percent.

observe in the data). The survey waves are two years apart in the HRS, so this allows us to track labor market outcomes for several years before and after the hospital admission.

My figures 1 and 2 show immediate and persistent declines in earnings and employment after a hospital admission. By comparison, we find that out-of-pocket medical spending increases by a much smaller magnitude. On average, the adults in our sample experience an annual increase in out-of-pocket medical spending of roughly $1,400 in the three years after admission, with the increased spending heavily concentrated in the first year after admission. By contrast, the decline in earnings is persistent and, if anything, increases over time after the index admission.

What causes this decline in earnings and employment? Our paper develops a simple model that emphasizes how health shocks can reduce labor market productivity (and thus wages) and increase the disutility of work.[5]

5. Our paper also describes another possibility, which is that a hospital admission can reduce life expectancy, and this could in turn reduce earnings and employment through life-cycle effects. We ultimately conclude from stylized calibrations that this is not likely to be the primary explanation for the decline in earnings and employment that we observe in our data.

Figure 3. The Effect of Hospital Admission on Retirement[a]
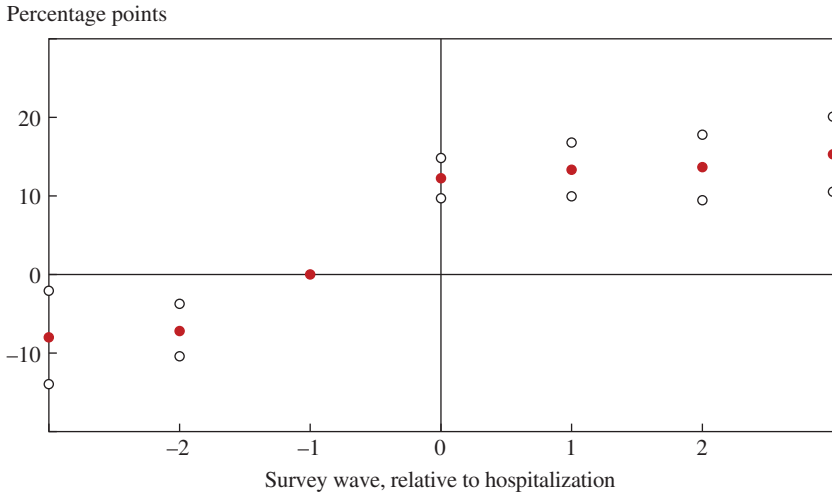
Percentage points

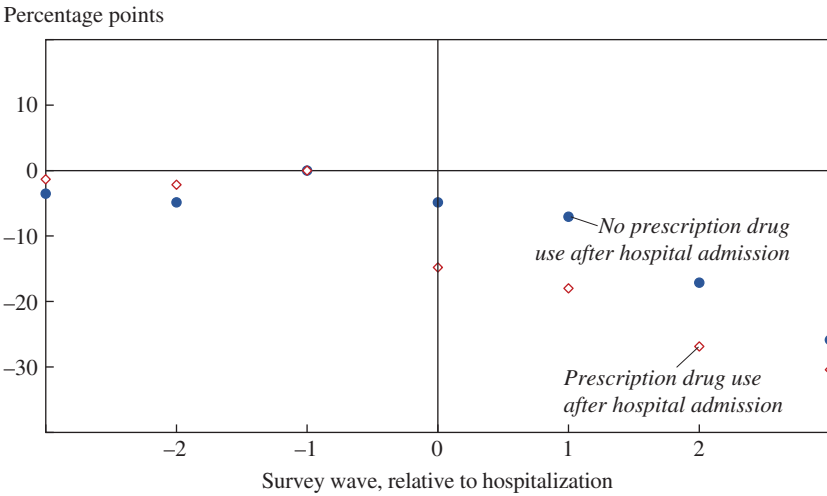Survey wave, relative to hospitalization

Sources: Dobkin and others (2018); author's calculations.

a. This figure shows the change in the probability of retiring after hospitalization, based on an event study using ordinary least squares regression. The dependent variable is defined to be 100 if the individual is retired, and 0 otherwise. See the notes to figure 1. The prehospitalization mean is 9.8 percent.

Alongside the decrease in earnings and employment, we also find changes in retirement patterns, with some of the hospital admissions leading to early retirement.[6] We also find large and persistent increases in individuals reporting that their ability to work is limited by their health. These results are shown in my figures 3 and 4.

I find a useful benchmark for the estimated earnings declines from hospital admissions to be the estimates from the job displacement literature (Jacobson, LaLonde, and Sullivan 1993; Sullivan and von Wachter 2009). Comparisons with the estimates in this literature suggest that the average hospital admission in our sample is associated with earnings declines that are in the ballpark of an average job displacement coming from a mass layoff event. For individuals who are not old enough to be able to claim Social Security retirement benefits in the years after their hospital admission, we find that these individuals experience income declines that are similar

6. Although our paper is primarily descriptive, we try to derive normative implications by showing how our model can translate the earnings and employment changes into a money-metric change in utility using external information on the labor supply elasticity. Intuitively, the more elastic is the retirement decision to the wage and the disutility of work, the lower the welfare consequences of a health shock that induces early retirement.

Figure 4. The Effect of Hospital Admission on Whether One's Health Limits One's Ability to Work[a]

Percentage points

Survey wave, relative to hospitalization

Sources: Dobkin and others (2018); author's calculations.

a. This figure shows the change in the probability of reporting that one's health limits one's ability to work after hospitalization, based on an event study using ordinary least squares regression. The dependent variable is defined to be 100 if the individual reports that his or her ability to work is limited by his or her health, and 0 otherwise. See the notes to figure 1. The prehospitalization mean is 21.9 percent.

to the earnings declines, suggesting that little of the lost household income is replaced by other sources.

Taken together, the findings of Dobkin and others (2018) indicate that health shocks have significant labor market consequences. To more directly engage with Krueger's hypothesis, I now move beyond the results that are reported by Dobkin and others (2018) and provide new results using the same HRS data. I use the same empirical specification, but I now study changes in prescription drug utilization after a hospital admission. The results are shown in my figure 5.

This figure shows that there is a sharp increase in prescription drug utilization around the time of a hospital admission, with the use of any prescription drugs increasing by roughly 10 to 15 percentage points in the years after a hospital admission. This result fills out another step of the causal chain outlined above, which is that health shocks lead to an increase in the use of prescription drugs. Unfortunately, I cannot separate pain medication from other drugs in the HRS data, but I speculate that this overall

Figure 5. The Effect of Hospital Admission on Prescription Drug Use[a]

Percentage points

Survey wave, relative to hospitalization

Sources: Health and Retirement Study; author's calculations.

a. This figure shows the change in the probability of reporting prescription drug use after hospitalization, based on an event study using ordinary least squares regression. The dependent variable is defined to be 100 if the individual reports using prescription drugs, and 0 otherwise. See the notes to figure 1. The prehospitalization mean is 71.8 percent.

increase in prescription drug utilization is at least partly driven by increases in the utilization of prescription pain medication.

The final set of new results that are inspired by Krueger's work restricts the sample to individuals who were not using prescription drugs before the index hospital admission. I can then estimate event study coefficients both for individuals who subsequently begin to take prescription drugs after a hospital admission and those who do not. Without any plausibly exogenous variation in prescription drug utilization, these results need to be interpreted tentatively; but the results in my figure 6 provide some initial evidence that individuals who subsequently begin to use prescription drugs after a hospital admission experience larger drops in labor force participation, as measured by the share who are working full time. My figure 7 shows that the comparison between these two subsamples of admissions is statistically significant based on differencing the pairs of event study coefficients in my figure 6.

These results can be quantified in a regression model that extends the specification given by Dobkin and others (2018) by interacting a

Figure 6. The Effect of Hospital Admission on Working Full Time, Stratified by Prescription Drug Use[a]

Percentage points

Survey wave, relative to hospitalization

Sources: Health and Retirement Study; author's calculations.
a. This figure shows the change in the probability of being employed after hospitalization, based on an event study using ordinary least squares regression. The dependent variable is defined to be 100 if the individual is working full time, and 0 otherwise. See the notes to figure 1. The sample is limited to individuals who were not regularly using prescription drugs before their hospital admission.

Figure 7. The Effect of Hospital Admission on Working Full Time, Difference in Event Study Estimates[a]

Percentage points

Survey wave, relative to hospitalization

Sources: Health and Retirement Study; author's calculations.
a. This figure shows the difference between the values in figure 6. See the notes to figures 1 and 6.

posthospitalization indicator with an indicator for whether the individual subsequently begins to use prescription drugs. This variable captures the additional effect of a health shock on the labor supply for individuals who begin to use prescription drugs after a hospital admission (relative to individuals who continue not to take prescription drugs regularly).

An obvious concern with this specification is that different types of health shocks generate differences in prescription drug utilization after a hospital admission. If this is correlated with the type or severity of the health shock, this may create a spurious correlation with the prescription drug use interaction term. To try to control for the severity of the health shock, I use the number of nights spent in the hospital, the number of hospital visits, and the additional number of chronic diseases the individual subsequently reports between the survey waves containing the index hospital admission. These results are reported in my table 1. Although these variables jointly predict the effect of hospital admission on employment (with more severe health shocks, as measured by nights in the hospital, associated with larger declines in employment), the interaction on prescription drug utilization remains similar in magnitude. The magnitude is also economically large, with perhaps as much as a third to half the overall reduced-form effect of hospital admission on employment accounted for by the increased likelihood of utilization of prescription drugs.

These results are far from definitive, but I view them as complementing and reinforcing Krueger's findings.[7] My analysis of HRS data suggests that the utilization of prescription drugs after a hospital admission is associated with larger declines in employment.

EXTENDING THE ANALYSIS OF FEMALE LABOR FORCE PARTICIPATION TRENDS Krueger briefly discusses some research on female LFP trends in the United States and other developed countries. Unlike the effect of health shocks on labor market outcomes, female LFP is far outside my area of expertise. However, I found this part of the paper interesting, thought-provoking, and worth exploring further. Toward that end, I use the Canadian Labour Force Survey to produce a parallel set of figures showing female LFP over the life cycle across birth cohorts, which can then be directly compared with Krueger's analysis using the Current Population Survey.[8]

---

7. One potential avenue for future work could build on the structural break techniques employed by Evans, Lieber, and Power (2017) to identify sharp changes in drug abuse. Sharp changes in drug abuse may lead to sharp changes in LFP.

8. In ongoing work with Kory Kroft, Fabian Langue, and Matthew Tudball, we use the restricted-use Canadian Labour Force Survey data to study long-term joblessness during and after the Great Recession (Kroft and others 2017).
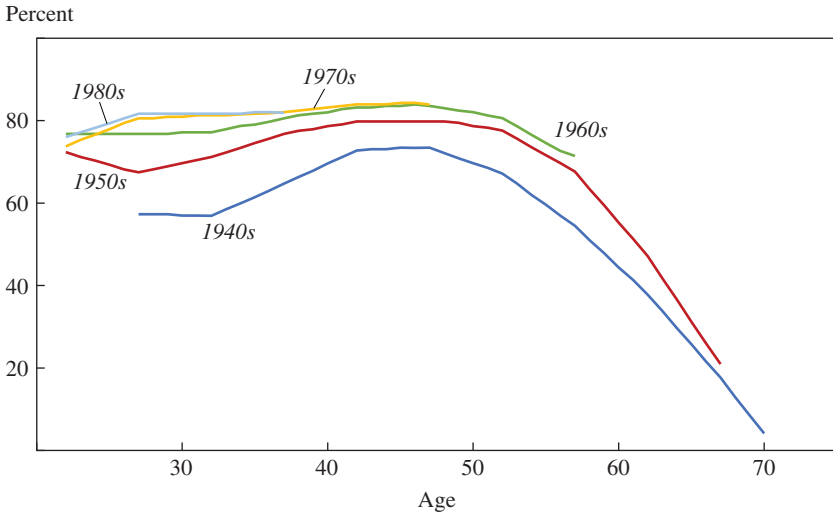
Table 1. Effect of Hospital Admission on Working Full Time[a]

	Full sample	Sample restricted to individuals not taking prescription drugs before hospitalization					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Effect at 12 months following hospitalization	−8.3 (1.9)	−13.7 (4.2)	−8.0 (5.0)	−8.3 (5.0)	−8.7 (5.0)	−8.1 (5.0)	−9.3 (5.0)
Effect at 36 months following hospitalization	−10.0 (2.5)	−12.5 (5.0)	−9.0 (5.4)	−9.3 (5.5)	−9.4 (5.4)	−9.0 (5.5)	−9.8 (5.5)
Effect from beginning prescription drug use following hospitalization			−9.0 (4.1)	−8.4 (4.1)	−7.7 (4.1)	−9.1 (4.1)	−7.1 (4.1)
Interaction between beginning prescription drug use and the number of hospital stays				−12.5 (5.0)			−1.5 (1.9)
Interaction between beginning prescription drug use and the number of nights in the hospital					−0.8 (0.4)		−1.0 (0.5)
Interaction between beginning prescription drug use and the additional number of reported diseases						2.6 (2.0)	5.2 (0.2)
Prehospitalization mean[b]	67.1	75.7	75.7	75.7	75.7	75.7	75.7
No. of individuals	2,732	621	621	621	621	621	621
No. of observations	13,286	3,183	3,183	3,183	3,183	3,183	3,183

Sources: Dobkin and others (2018); author's calculations.

a. This table shows the change in the probability of being employed after hospitalization, based on an event study using ordinary least squares regression. The sample includes people age 50–59 who are insured at the time of hospital admission, and the estimates are weighted using survey weights. The reported effects are reweighted to correct for timing features of the survey, namely, assuming a uniform distribution of hospitalizations in the two years between survey waves and a piecewise linear spline functional form with knots at 12 and 36 months, using the true distribution of the month of the survey within the year, and adjusting for the reporting window. See appendix C in Dobkin and others (2018) for methodological details. Standard errors clustered by individuals are in parentheses.

b. Prehospitalization means are calculated using the survey wave preceding the hospitalization.

Figure 8. Life Cycle Labor Force Participation for Canadian Women by Birth Cohort[a]

Percent

Sources: Canadian Labour Force Survey; author's calculations.
a. The line captions indicate birth cohorts. Labor force participation is reported by age group, where each group is defined by five-year intervals. This figure plots the midpoint age in each interval.

In analyzing the Current Population Survey data, Krueger finds a "stalling out" of increasing female LFP in recent cohorts, with women born in the 1980s having broadly similar life cycle LFP profiles to those born in the 1960s and 1970s (see Krueger's figure 9).

My figure 8 shows an analogous pattern for Canada, with a similar stalling out of increasing female LFP across cohorts, and with Canadian women born in the 1980s experiencing similar life cycle LFP as women born in the 1970s. However, though the trends across cohorts (and the existence of a stalling out) are similar across the two countries, my figure 9 directly compares cohorts in Canada and the United States for several decades, and the results show persistently higher female LFP for Canada for a given set of birth cohorts, with the largest gaps between the countries in the most recent cohorts. The differences in female LFP between the United States and Canada grow to approximately 10 percentage points for women born in the 1970s.

Why has female LFP stalled out at a higher level in Canada compared with the United States? This question relates to an ongoing divergence in female LFP in the United States compared with many other developed countries. For example, while prime age female employment rates in the

Figure 9. Life Cycle Labor Force Participation for Canadian and U.S. Women by Birth Cohort[a]

Sources: Canadian Labour Force Survey; Current Population Survey; author's calculations.
a. See the notes to my figure 8.

United States were similar to those in France, Britain, and Germany in 2000, by 2016 the employment rates of prime age women in the United States lagged these other countries by 5 to 10 percentage points (Covert 2017).

If trends in female LFP in other developed countries provide a rough counterfactual of what the United States could accomplish under alternative policies, then this suggests policymakers may want to ask the narrower question, "Where are all the *female* workers?" Recent work by Henrik Kleven (2014) raises the provocative and intriguing possibility that some of the female employment gap between the United States and other developed countries may come from differences in what he calls "participation subsidies," which include public spending on child care, elderly care, and early childhood education. My own nonexpert view is that these policies, along with household tax reform, may provide meaningful boosts to female LFP. Regarding household tax reform, I am intrigued by the recent work of Kearney and Lesley Turner (2013) on modifying how the U.S. tax system treats secondary earners, who sometimes face very high marginal income tax rates arising through the "jointness" in the U.S. tax code (Kleven, Kreiner, and Saez 2009; Frankel 2014).

CONCLUSION Overall, I conclude from this paper that LFP is trending differently for different demographic groups, likely for different reasons. There is no Grand Unified Theory of aggregate LFP, so researchers will need to be paying attention to multiple fronts: changes in schooling, health-related barriers, gender-specific barriers related to child care and elderly care, and adverse labor demand shifts affecting different skill groups differently.

I think this paper provides important initial evidence on the role of pain medication in reducing the labor supply, and I expect this to be an active area of research in the near future. More broadly, I think recent work at the intersection of health economics and labor economics raises the possibility that workers in the United States may be "underinsured" to adverse health events, because health shocks generate not just medical expenses (which are largely covered by formal health insurance) but may also reduce earnings through a combination of decreases in labor market productivity or increases in the disutility of work. Krueger's broad emphasis on work limitations suggests to me that many workers outside the labor force find it difficult to return to work, which raises the important question of how well the social safety net is currently taking care of these individuals.

Finally, I am excited by labor economists' renewed focus on LFP and the employment rate. I think this represents an opportunity for researchers to develop and test new models that are better able to capture the relative

importance of shifts in demand and supply on aggregate and group-specific LFP. I think this represents an exciting area for future work, to which I hope to be able to contribute.

REFERENCES FOR THE NOTOWIDIGDO COMMENT

Abraham, Katharine G., and Melissa S. Kearney. 2018. "Explaining the Decline in the U.S. Employment-to-Population Ratio: A Review of the Evidence." Working Paper no. 24333. Cambridge, Mass.: National Bureau of Economic Research.

Acemoglu, Daron, and Pascual Restrepo. 2017. "Robots and Jobs: Evidence from US Labor Markets." Working Paper no. 23285. Cambridge, Mass.: National Bureau of Economic Research.

Autor, David H., and David Dorn. 2013. "The Growth of Low-Skill Service Jobs and the Polarization of the US Labor Market." *American Economic Review* 103, no. 5: 1553–97.

Autor, David H., David Dorn, and Gordon H. Hanson. 2013. "The China Syndrome: Local Labor Market Effects of Import Competition in the United States." *American Economic Review* 103, no. 6: 2121–68.

Charles, Kerwin Kofi, Erik Hurst, and Matthew J. Notowidigdo. 2016. "The Masking of the Decline in Manufacturing Employment by the Housing Bubble." *Journal of Economic Perspectives* 30, no. 2: 179–200.

———. 2017. "Housing Booms, Manufacturing Decline, and Labor Market Outcomes." *Economic Journal*, forthcoming.

Covert, Bryce. 2017. "The Best Era for Working Women Was 20 Years Ago." *New York Times*, September 2.

Dobkin, Carlos, Amy Finkelstein, Raymond Kluender, and Matthew J. Notowidigdo. 2018. "The Economic Consequences of Hospital Admissions." *American Economic Review* 108, no. 2: 308–52.

Evans, William N., Ethan Lieber, and Patrick Power. 2017. "How the Reformulation of OxyContin Ignited the Heroin Epidemic." Working paper. https://www3.nd.edu/~elieber/research/ELP.pdf

Frankel, Alexander. 2014. "Taxation of Couples under Assortative Mating." *American Economic Journal: Economic Policy* 6, no. 3: 155–77.

Gordon, Robert J. 2016. *The Rise and Fall of American Growth: The U.S. Standard of Living since the Civil War.* Princeton University Press.

Jacobson, Louis S., Jobert J. LaLonde, and Daniel G. Sullivan. 1993. "Earnings Losses of Displaced Workers." *American Economic Review* 83, no. 4: 685–709.

Kearney, Melissa S., and Lesley J. Turner. 2013. "Giving Secondary Earners a Tax Break: A Proposal to Help Low- and Middle-Income Families." Discussion Paper no. 2013-07. Washington: Brookings Institution, Hamilton Project.

Kleven, Henrik Jacobsen. 2014. "How Can Scandinavians Tax So Much?" *Journal of Economic Perspectives* 28, no. 4: 77–98.

Kleven, Henrik Jacobsen, Claus Thustrup Kreiner, and Emmanuel Saez. 2009. "The Optimal Income Taxation of Couples." *Econometrica* 77, no. 2: 537–60.

Kroft, Kory, Fabian Lange, Matthew J. Notowidigdo, and Matthew Tudball. 2017. "Long Time Out: Unemployment and Joblessness in Canada and the United States." Working paper. http://faculty.wcas.northwestern.edu/noto/research/KLNT_June_2017.pdf

Pierce, Justin R., and Peter K. Schott. 2016. "The Surprisingly Swift Decline of US Manufacturing Employment." *American Economic Review* 106, no. 7: 1632–62.

Sullivan, Daniel, and Till von Wachter. 2009. "Job Displacement and Mortality: An Analysis Using Administrative Data." *Quarterly Journal of Economics* 123, no. 1: 1265–306.

GENERAL DISCUSSION   George Perry wondered how Krueger had evaluated the labor force participation of couples, and if their behavior could be extrapolated from the data. For example, a prime age man might not be working while his wife is, or vice versa. Krueger responded that the data did allow one to observe the behavior of couples, but noted that most of the men who were not in the labor force were not married. So, though it is reasonable to hypothesize that the trends are driven by one breadwinning spouse supporting the other, these family compositions do not explain the overarching trends reported in the paper.

Steven Davis was struck by the high percentage of persons out of the labor force who have a history of incarceration, drug problems, serious health problems, or a combination of the three. Persons with these histories look risky to employers, because hiring them involves a higher probability of termination and costly litigation. As a result, employers have very strong incentives to screen intensively to avoid hiring persons with these histories. Part of the policy challenge is to make it more attractive for employers to hire these persons, giving them another chance at gainful employment. Meeting this challenge may require allowing for exceptions to current laws and regulations regarding discrimination.

Elaborating on Davis's point, Lawrence Katz stated that whatever the underlying cause is, it is a fact that many people who are out of the workforce have criminal records or drug problems, and that employers want to avoid hiring them. He noted that some feel-good policies meant to help these sorts of people, such as the Ban the Box campaign, have instead led employers to raise skill requirements and find other ways to discriminate. A better policy approach, he argued, would be for labor market intermediaries to vouch for such workers who demonstrate they are ready for a second chance, to give assurance to employers, and to incentivize employers to make these so-called risky hires. Several employment programs are already doing this and have shown some success for those with criminal records.

Justin Wolfers was surprised that the paper did not mention obesity as a potential influence of declining labor force participation, given its increasing prevalence in society. Building on this observation, N. Gregory Mankiw wondered how other health problems might influence the jobs people do. The paper mentions who is in pain and who is not, but does not discuss the broader health issues they face, and to what extent this interacts with the jobs people do. Mankiw noted that many modern jobs have become less physical over time, which means that people who do them get less exercise, which potentially contributes to obesity. Sitting all day in an office may contribute more to back pain than a physical job lifting boxes all day. Robert Hall added that there is a body of medical literature that suggests humans were not engineered by evolution to sit. Nonetheless, a considerable majority—at least two-thirds of American workers—sits at desks all day. He wondered how much of the pain reported was back pain. Hall thought it was probably a fair amount, given that back pain is one of the most prevalent sources of chronic pain.

Kristin Forbes appreciated that Krueger was candid about the paper's endogeneity and identification challenges, but suggested he continue to work to address these issues—such as by cross-country comparisons of labor force participation, as discussant Matthew Notowidigdo had done with female labor force participation in Canada. She was surprised that Krueger did not make a comparison to the United Kingdom, given that the two countries exhibit roughly similar economic trends, but the United Kingdom had not experienced the sharp fall in labor force participation seen in the United States. She also speculated that health is roughly similar in the two countries, or at least not different enough to fully explain the differences in labor force participation.

John Haltiwanger commented on a measurement issue inherent in the Current Population Survey's (CPS's) self-employment data. Evidence suggests that declines in labor force participation rates in the CPS are substantially overstated.[1] The problem stems from the observation that CPS self-employment rates (particularly in the post-2000 period) have been flat or declining, while administrative data reveal a rapid rise in self-employment. Haltiwanger's work matched the CPS and administrative data on a micro level, finding that a large share of individuals in the CPS report that they are

1. Katharine G. Abraham, John Haltiwanger, Kristin Sandusky, and James R. Spletzer, "Exploring Differences in Employment between Household and Establishment Data," *Journal of Labor Economics* 31, suppl. 1 (2013): S129–S172.

not self-employed while displaying activity on Form 1099 and Schedule C of Form 1040, and that this trend has been increasing rapidly over time. He believes that an increase in alternative workforce arrangements—that is, the rise of the gig economy—plays a nontrivial role in explaining this trend, and that the CPS does not pick this up. Haltiwanger joked that the implication of this in connection to Krueger's paper is that your Uber driver is probably on pain medication.

Martin Feldstein commented on the issue of occupational licensing, which has played an increasingly important role in society. One notable downside of occupational licensing is that it restricts people from crossing state lines. If a spouse finds a job in another state, a family may be disinclined to move because the other spouse cannot take a job there due to occupational licensing restrictions. Similarly, if a person is licensed in one state and loses his or her job, the individual's job prospects are dampened, because he or she faces an additional barrier to getting a job in a different state. Occupational licensing may be an important reason why people are not moving, he concluded.

James Hines wondered to what extent Krueger's results were picking up the salutary effects of employment. That is, does someone who is employed and has the same underlying pain as an unemployed person focus on the pain less because he or she is working all day? If that is the case, then that person might be less likely to take opioids than the unemployed person with the same underlying pain.

Alan Blinder was curious about the two-way causation between opioids and being out of the labor force. He wondered if there were data that could provide some type of instrument to examine how doctors vary across counties. Given the large cross-county disparities in opioid usage, it would be useful to know if certain types of doctors are more likely to prescribe opioids than others.

Adele Morris wanted to know more about what has been occurring with regard to disability programs, and, in particular, what their trends and spatial variation look like. Much has been made of the variation and the propensity for doctors to approve disability applications or provide evidence in support of them. This could be useful, in addition to evidence on the propensity of doctors to proscribe opioids.

Janice Eberly was struck by the heterogeneity of women who were not in the labor force, and why their actions—and in particular, keeping house—had such a strong influence on their well-being. She wondered if Krueger had additional data to explore what might be behind this effect—whether it is truly the "joy of housekeeping" or actually that they have

a house to keep or family members to care for. The results may be more related to isolation than housekeeping.

Christopher Rugaber wondered if claims of pain and suffering were taken too indulgently, whether they should be taken at face value, and how this has changed over time. That is, how accurate are these self-proclaimed problems?

Krueger responded to several of the questions raised. To start, he did not have good information about how health (and pain) has deteriorated or improved over time, but he knew that what has changed is the treatment of pain, especially with regard to how the medical profession deals with it. He conceded that the issue of causality might be less important than he initially maintained, noting that he is examining the issue in a separate project, by working with medical professionals on an intervention to help people recover from addiction. By supplementing that project with labor force questions, he will be able to look at the effect of treatment on labor force participation.

With regard to Davis's and Katz's points about risky hires, Krueger believes that society needs to face the inherent problems if the goal is to bring people back to work, regardless of what caused them to leave. He noted that getting rid of an addiction is easier than getting rid of a criminal record; though opioid treatments are expensive, they appear to be efficacious.

In response to Wolfers's comment about obesity, Krueger stated that the CPS does not contain data on weight. One can, however, look at labor force participation rates for different disabilities and how they have changed over time. For example, Krueger was struck by the fraction of people saying they have difficulty concentrating and remembering, which has potentially significant consequences. He suspected it was related to the rising epidemic of overprescribing medications for attention deficit disorder; many of the children who were prescribed these medications are now adults, and the problems are likely carrying over into the workforce.

With regard to Haltiwanger's concern about administrative data versus survey data, Krueger conceded that he was well aware of the divergence between the two. One interesting thing to note is that labor force participation has been rising for older workers, which is the group most likely to be self-employed. Even though measurement issues between administrative and survey data are important to highlight, he thinks the problem goes beyond that.

Krueger fully agreed with the concerns raised by Feldstein about occupational licensing. In a paper written with Morris Kleiner, the authors found that one-third of workers are required to have a license to do their

job.[2] Krueger thinks the easiest policy response is to allow for reciprocity between states, which, during his time in the Obama administration, he tried hard to implement for military families. The issue is salient for military families, because if a soldier is transferred from one base to another, his or her spouse might have to go through the whole certification process multiple times.

In response to Hines's and Blinder's comments on the geographic variation of medical practices, Krueger believes this is an important piece of the puzzle. Looking at the average amount of opioids prescribed per county, the counties in the top and bottom deciles of the distribution vary by a factor of 31 to 1. To put this in perspective, employment in manufacturing and similar fields does not vary nearly as much between the top and bottom deciles. A paper by Molly Schnell and Janet Currie found that doctors who went to low-ranked schools were more likely to prescribe opioids than doctors who went to high-ranked schools within the same practice.[3] Krueger noted that he had considered using this factor as an instrument, but was worried about how people choose their doctors. In order to get at causality, he thought it was better to team up with medical professionals running a clinical trial that involved a clear intervention.

Kruger stated that Eberly was absolutely right in her intuition about the "joy of housekeeping." The things associated with keeping house do not look like they are fun in the well-being surveys. The difference is that people who do not have the opportunity to keep house really are miserable, and they may be comparing themselves with other people who are working or are in happier families.

On Morris's question about disability insurance, Krueger noted that the largest growth in disability insurance has been for disabilities such as back injuries, as Hall suspected, which are harder to objectively evaluate. To determine if someone is disabled, one thing that judges look for is whether a person is taking pain medication. This could actually compound the problem if it is not helping to improve the disabled individual's functioning. Krueger was struck by the fact that disability insurance seems to be a natural explanation for the rising opioid epidemic: People leave the labor force and are reluctant to come back because they do not want to

---

2. Morris M. Kleiner and Alan B. Krueger, "Analyzing the Extent and Influence of Occupational Licensing on the Labor Market," *Journal of Labor Economics* 31, suppl. 1 (2013): S173–S202.

3. Molly Schnell and Janet Currie, "Addressing the Opioid Epidemic: Is There a Role for Physician Education?" Working Paper no. 23645 (Cambridge, Mass.: National Bureau of Economic Research, 2017).

lose disability insurance and Medicare, which pays for opioids and health insurance when they are out of the labor force. However, the disability insurance explanation did not seem large enough. A report from California found that participation in disability insurance grew by only 2 percentage points, while labor force participation for prime age men fell by 7 percentage points. The report also found that 30 percent of people who did not receive disability insurance are still trying to get on it.

Finally, in response to Rugaber's question about the accuracy of self-reported pain data, Krueger emphasized that levels of pain are subjective. The best one can do is look at how well the self-reports correspond to people's behavior. A paper Krueger wrote with Arthur Stone found that people who report being in pain live more restricted lives—that is, they go out less, interact with people less, and spend more time watching TV.[4] So, though there is a clear signal, Krueger was concerned that the signal could change over time, as could the bar for reporting pain. Subjective well-being is an area where one needs to be cautious. This is partly why Krueger looked specifically at people taking pain medication, which is a behavioral response one can observe, and which aligns with people reporting that they have pain.

4. Alan B. Krueger and Arthur A. Stone, "Assessment of Pain: A Community-Based Diary Survey in the USA," *The Lancet* 371, no. 9623 (2008): 1519–25.

EXHIBIT 186

Hiring Hurdle: Finding Workers Who Can Pass a Drug Test

By Jackie Calmes

May 17, 2016

SAVANNAH, Ga. — A few years back, the heavy-equipment manufacturer JCB held a job fair in the glass foyer of its sprawling headquarters near here, but when a throng of prospective employees learned the next step would be drug testing, an alarming thing happened: About half of them left.

That story still circulates within the business community of this historic port city. But the problem has gotten worse.

All over the country, employers say they see a disturbing downside of tighter labor markets as they try to rebuild from the worst recession since the Depression: They are struggling to find workers who can pass a pre-employment drug test.

That hurdle partly stems from the growing ubiquity of drug testing, at corporations with big human resources departments, in industries like trucking where testing is mandated by federal law for safety reasons, and increasingly at smaller companies.

But data suggest employers' difficulties also reflect an increase in the use of drugs, especially marijuana — employers' main gripe — and also heroin and other opioid drugs much in the news.

Ray Gaster, the owner of lumberyards on both sides of the Georgia-South Carolina border, recently joined friends at a retreat in Alabama to swap business talk. The big topic? Drug tests.

"They were complaining about trying to find drivers, or finding people, who are drug-free and can do some of the jobs that they have," Mr. Gaster said. He shared their concern.

Drug use in the work force "is not a new problem. Back in the '80s, it was pretty bad, and we brought it down," said Calvina L. Fay, executive director of the Drug Free America Foundation. But, she added, "we've seen it edging back up some," and increasingly, both employers and industry associations "have expressed exasperation."

Data on the scope of the problem is sketchy because figures on job applicants who test positive for drugs miss the many people who simply skip tests they cannot pass.

Nonetheless, in its most recent report, Quest Diagnostics, which has compiled employer-testing data since 1988, documented an increase for a second consecutive year in the percentage of American workers who tested positive for illicit drugs — to 4.7 percent in 2014 from 4.3 percent in 2013. And 2013 was the first year in a decade to show an increase.

John Sambdman, who employs about 100 people in Atlanta at Samson Trailways, which provides transportation for schools, events, tour groups and the military, must test job applicants and, randomly, employees. Many job seekers "just don't

bother to show up at the drug-testing place," he complained. Just on Thursday, Mr. Sambdman said, an applicant failed a drug test.

In August, Gov. Nathan Deal of Georgia promised to develop a program to help because so many business owners tell him "the No. 1 reason they can't hire enough workers is they can't find enough people to pass a drug test."

That program is still under discussion. When job seekers contact Georgia's Department of Labor, which provides some recruitment services to employers, the state would like to begin testing them for drugs; individuals who test positive could receive drug counseling and ultimately job placement assistance, Mark Butler, the state labor commissioner, said in an interview.

"Obviously, it's not an easy process, and it would be costly," Mr. Butler said. "But you've got to think: What is the reverse of that?" People needed to fill jobs are turned away, and, he added, "it's pretty much a national issue."

In Indiana, Mark Dobson, president of the Economic Development Corporation of Elkhart County, said that when he went to national conferences, the topic was "such a common thread of conversation — whether it's in an area like ours that's really enjoying very low unemployment levels or even areas with more moderate employment bases."

In Colorado, "to find a roofer or a painter that can pass a drug test is unheard-of," said Jesse Russow, owner of Avalanche Roofing & Exteriors, in Colorado Springs. That was true even before Colorado, like a few other states, legalized recreational use of marijuana.

In a sector where employers like himself tend to rely on Latino workers, Mr. Russow tried to diversify three years ago by recruiting white workers, vetting about 80 people. But, he said, "As soon as I say 'criminal background check,' 'drug test,' they're out the door."

While the employers' predicament is worsened by a smaller hiring pool, the drug problem for those that require testing is not as bad as it once was. "If we go back to 1988, the combined U.S. work force positivity was 13.6 percent when drug testing was new," said Dr. Barry Sample, Quest's director of science and technology.

But two consecutive years of increases are worrisome, he said.

A much broader data trove, the federal government's annual National Survey on Drug Use and Health, reported in September that one in 10 Americans ages 12 and older reported in 2014 that they had used illicit drugs within the last month — the largest share since 2001.

Taken together, Dr. Sample said, his data and the government's indicate higher drug use among those who work for employers without a drug-testing program than workers who are tested, though use by the latter increased as well in 2013 and 2014.

Testing dates to the Reagan administration. The 1988 Drug-Free Workplace Act required most employers with federal contracts or grants to test workers. In 1991, Congress responded to a deadly 1987 train crash in which two operators tested positive for marijuana by requiring testing for all "safety sensitive" jobs regulated by the Transportation Department. Those laws became the model for other employers. Some states give businesses a break on workers' compensation insurance if they are certified as drug-free.

Here at the main yard of Gaster Lumber and Hardware, faded certificates and signs ("Drugs Don't Work Here") attest to its certification as a drug-free workplace since 1994.

Mr. Gaster's human resources director, Chuck Keller, said that status reduced workers' compensation payments for its nearly 50 employees by 7.5 percent in Georgia and 5 percent in South Carolina. The savings, about $4,000 this year, offset costs of about $2,500 for laboratory and on-site testing and related requirements.

Kevin Canty, a worker in the lumberyard of Gaster Lumber and Hardware in Savannah, Ga. Kevin D. Liles for The New York Times

"We're always short of drivers," Mr. Gaster said, "and drug testing is part of it."

Terry Donaldson, 53, who was tested when he started 20 years ago, supports the policy: "If they want to have a good job, the drugs got to go."

So it was for some of his new co-workers.

Britt Sikes, 38 and a single father to three young girls, lost his teeth to methamphetamine and used marijuana since he was 8 — until three weeks before taking the test for his $13-an-hour job as a Gaster door installer.

"I'm a recovering drug addict myself, and to raise my girls, I had to learn to leave it alone," Mr. Sikes said.

Kevin Canty, 55, said that in his experience, "most people can't pass the drug test because they don't want to pass a drug test."

"They want the job," he added, but "they still want to be in that lifestyle. And they have to choose."

One of the newest hires, Frederick Brown, 34, said, "I come from a society where drugs is common — marijuana, weed, it's common," and people who cannot pass a drug test seek work at McDonald's. Most restaurants do not test. "I asked for this job," Mr. Brown said, calling it a blessing. "I already knew what I had to do — you know what I'm saying?"

Follow The New York Times's politics and Washington coverage on Facebook and Twitter, and sign up for the First Draft politics newsletter.

A version of this article appears in print on , Section B, Page 1 of the New York edition with the headline: One Step Short of Hired

EXHIBIT 187

115th CONGRESS *2nd Session* }	HOUSE OF REPRESENTATIVES {	REPORT 115-596

THE 2018 JOINT ECONOMIC REPORT

REPORT

OF THE

JOINT ECONOMIC COMMITTEE
CONGRESS OF THE UNITED STATES

ON THE

2018 ECONOMIC REPORT
OF THE PRESIDENT

TOGETHER WITH
MINORITY VIEWS

MARCH 13, 2018. — Committed to the Committee of the Whole House on the state of the Union and ordered to be printed

II

_____

March 13, 2018

HON. PAUL RYAN
Speaker, U.S. House of Representatives
Washington, DC

DEAR MR. SPEAKER:

Pursuant to the requirements of the *Employment Act of 1946*, as amended, I hereby transmit the 2018 Joint Economic Report. The analyses and conclusions of this Report are to assist the several Committees of the Congress and its Members as they deal with economic issues and legislation pertaining thereto.

Sincerely,

Erik Paulsen
Chairman

CONTENTS

Chapter 2: Republicans Undermine Americans' Health Care 282

Chapter 3: Republicans Shift Responsibility to States and Private Sector 293

Chapter 4: Trump Regulatory Agenda Puts Special Interests Ahead of Workers 306

115th Congress *2nd Session* }	HOUSE OF REPRESENTATIVES {	REPORT 115-596

THE 2018 JOINT ECONOMIC REPORT

March 13, 2018. – Committed to the Committee of the Whole House on the state of the Union and ordered to be printed

---

Mr. Paulsen, from the Joint Economic Committee,
submitted the following

REPORT

together with

MINORITY VIEWS

Report of the Joint Economic Committee on the 2018 Economic Report of the President

Chairman's Views

Introduction

America has always had great economic potential because of her greatest resource: Americans. When Government steps back and allows Americans to work hard and produce goods, the entire world thrives. Just look at the U.S. economy today, which is off to a strong start in 2018. It has added 550,000 new jobs during the first two months. In 2017, the economy already grew much faster than the year before (Figure 1), as it generated 2.2 million new jobs. What could account for such a sea change? The answer is simple: Government is once again allowing Americans to do what they do best.

It is rare that improvements in policy show results so quickly, and this validates the direction that the 115th Congress and the new Administration have taken with the economy. The *Tax Cuts and Jobs Act* (TCJA) and ongoing efforts to eliminate senseless and wasteful job-choking regulations have gained traction and demonstrated the robust benefits of pro-growth economic policies.

Our nation faces two challenges ahead. The first, on which we are making progress, is to accelerate the lackluster recovery from the 2008 recession. The second is to make the economy's potential for growth stronger and longer lasting in the face of long-term trends that tend to slow growth, particularly the aging of the population.

In addition to implementing better tax and regulatory policies generally, the Government can play a constructive role in key sectors of the economy, such as health care, education, infrastructure, cybersecurity, and international trade, by removing obstacles to better market performance. To each of these areas, the *Economic Report of the President and the Annual Report of the Council of Economic Advisers* (*Report*) devotes a chapter, and the Joint Economic Committee Majority Response (*Response*) offers recommendations in the chapters that follow.

Figure 1

Real GDP Growth (Annualized Rates)

Source: BEA/Haver Analytics

Accelerating Growth in the Near Term

Job growth is booming even as the unemployment rate has declined to 4.1 percent—the lowest since the year 2000—and the output gap from the last recession has closed relative to recent Congressional Budget Office (CBO) estimates of what the economy is capable of producing. The Committee Majority has long held that the American people could have achieved greater economic growth were it not for the constraints of the prior Administration's policy.

The *Response* of February 2017 to the outgoing Obama Administration *Report* showed how slowly the United States recovered from the last recession. It fell far short of past recoveries and even of the Obama Administration's own expectations. It also showed that the Congressional Budget Office (CBO) downgraded the economy's potential output in each of the eight years that President Obama was in office, as shown in Figure 2.[1]

Figure 2

Constrained U.S. Economic Potential

Since then, the JEC has investigated the particulars of what has restrained the economy. Our hearing witnesses and research have provided keen insights to how the current state of the economy compares with its potential.

If the economy were inescapably stuck in low gear, then policy actions that increase Federal deficits, as well as accommodative monetary policy, would be inappropriate. However, if the economy's potential were raised again – for example, to where CBO's 2013 projection predicted it would be in 2018 (Figure 3) – then there would be an appreciable output gap between actual and potential GDP that would allow faster growth without "overheating" the economy. Expansionary policies would be less likely to lead to unwanted inflation, and the size of the deficit would be of less immediate concern if economic growth accelerates toward potential. A growing economy with a good chance of rising potential means we are returning to normalcy, and all efforts should go towards reinforcing this trend. Instead of focusing efforts on needless precautionary measures that could

hamper this growth, lawmakers ought to embrace the change for what it is: A restoration of America's prosperity.

Figure 3

Impaired Market Function and Constrained Potential

America needs headroom for faster economic growth, as illustrated by Figure 3. While the aging of the population and other factors may pose inevitable constraints, smarter policy choices can improve the functionality of America's entrepreneurial market economy. Americans can do better if Government gets out of the way.

This approach stands in contrast to the Obama Administration. It reflexively resorted to Government interventions as it continually emphasized market imperfections, externalities, inequality, and "selfish" motives of businesses, while blaming challenging fundamentals as reasons for slow growth beyond its control. Yet the Obama Administration's pro-Government orientation piled on to challenges facing the market economy by attempting to increase control over it. The previous Administration claimed that its fiscal policy had averted a worse economic outcome in the short term and promoted long-term Government programs to raise economic

potential. President Obama extolled the virtues of public service in commencement speeches to college graduates and encouraged them to choose Government careers.

Economists from Friedrich Hayek (1974 Nobel Prize), to Milton Friedman (1976 Nobel Prize), to George Stigler (1982 Nobel Prize) and James Buchanan (1986 Nobel Prize), among many others, presented reasons and evidence that challenge faith in Government to correct market imperfections and improve the economy. Government institutions are not wise and dispassionate; on the contrary, they lack critical knowledge (Hayek), are slow to react (Friedman), are prone to capture by special interests (Stigler), and are disposed to pursue political and bureaucratic self-interest over the public interest (Buchanan and the school of public choice). For these reasons, one must carefully focus Government market intervention so that its benefits truly exceed its costs.

The U.S. economy used to deliver much higher GDP per capita than other developed economies because the private sector had more freedom to operate and faced fewer Government mandates. Figure 4 is based on *The Index of Economic Freedom* by the Heritage Foundation and depicts the relationship between per capita GDP growth and economic freedom across the 35 countries in the Organization of Economic Cooperation and Development (OECD) for the year 2000.[2]

Figure 4

Economic Freedom-Real Per Capita GDP: 2000

Sources: OECD, Heritage Foundation Index of Economic Freedom

As it became clearer that an economic resurgence was not forthcoming, the Obama Administration progressively tempered its economic outlook, but it refused to concede that its policies had failed (see 2017 *Response*). Instead, it claimed that the financial origin of the recession, and its severity, had made recovery more difficult than anticipated,[3] and it emphasized the aging of the population and reduced productivity as reasons why the economy was settling into a meager annual growth rate about a third less than the postwar average of more than 3 percent.[4]

Testimony at the JEC's "Dynamism" hearing confirms that aging populations are less entrepreneurial, innovative, and adaptable to changing economic conditions. Aging shifts entrepreneurship down as measured by new business startups.

Figure 5

Entrepreneurship Rates in Countries with Young, Middle, and Old Populations

Lazear, Edward P. "The Decline of Economic Opportunity in the United States: Causes and Consequences." Testimony before the Joint Economic Committee of the United States Congress, April 5, 2017, Figure 5.

Figure 5, from a study that our witness, Stanford University economics professor and former CEA chairman Edward Lazear coauthored, shows that entrepreneurial activity shifts down across all age groups when the population's median age increases. To counteract such a shift, an economy should be moving to the *right* in Figure 4, which is precisely what many countries have done.

According to the Heritage Foundation, economic freedom increased in 14 OECD countries since 2008 and declined in 19, but in none as much as the United States (Figure 6). Figure 7 shows that by 2017 many countries had moved up and to the right in per capita GDP and economic freedom, while the United States moved to the *left*.

9

Figure 6

Economic Freedom: Change from 2008 to 2017

Source: Heritage Foundation Index of Economic Freedom

We have lost ground relative to other countries that have made their economies more business friendly in terms of taxation and regulation.

Figure 7

Economic Freedom-Real Per Capita GDP: 2017

Sources: OECD, Heritage Foundation Index of Economic Freedom

Improvements in other countries. America's postwar international economic policy succeeded in substantially lowering barriers to foreign trade and investment around the world. Technical advances reduced shipping and communications costs, making it easier to relocate production facilities and sell from abroad, including back to the home country.

Recognizing the global scope of markets and the international mobility of capital, other countries reduced both the tax rates of companies doing business in their jurisdictions (Figure 8), and the regulation of domestic product markets (Figure 9). The U.S. Government, on the other hand, took the relative strength of the American market economy for granted at a time when competition was growing fierce. The Government failed to improve domestic business conditions and, if anything, worsened them. The U.S. corporate income tax rate, once among the lowest in the world, became the highest in the OECD—that is, until TCJA became law.

Figure 8

Change in Corporate Tax Rates 2000-2017

Figure 9

Change in Product Market Regulations 1998-2013

Project delays in the United States have become notorious to the point that it can take many times longer to refurbish a bridge, for instance, than it once took to build it.[5] The World Bank ranks the United States 36th in the world for obtaining a construction permit. Such a ranking suggests the U.S. Government, in its sluggish

approach to permitting, fails to prioritize the fast pace of its job creators. This lens is useful when considering that the World Bank also dropped the U.S. from 6th place in 2008 to 49th for ease of starting a business (Figure 10).[6] In other words, the entrepreneurial market economy of the United States, teeming with job creators and innovators seeking to meet the demands of families all over the world, is busy filling out paperwork and waiting for permits.

Figure 10

Ease of Starting a Business, U.S. Worldwide Rank

Self-imposed handicaps. Multinational companies cannot operate as effectively or as profitably if they have to operate entirely in high-tax jurisdictions. Imagine finding the U.S. tax system so burdensome that a company's optimal choice is resorting to adjusting the prices at which they transfer intermediate goods among their international subsidiaries to shift cost recognition; borrowing among subsidiaries from different countries to claim tax-deductible interest expense; and practicing tax inversion by headquarter relocation through a U.S. company merging with or acquiring a foreign company and changing its incorporation to the foreign company's country. There is nothing simple, or efficient, about such a system.

Dozens of U.S. corporations have moved their headquarters overseas. When U.S. companies establish production facilities outside the country for tax reasons, they take with them productive capacity, jobs, and economic growth. The American Government should not be writing off these opportunities, given the vast number of Americans who are clamoring for a shot at prosperity.

Additionally, corporate maneuvers to minimize U.S. tax liability expend resources for little or no gain in output; they are wasteful, and so too are the government's efforts in response to plug loopholes in the tax code, many of which result in unintended consequences. Why would we stick with a system where we demand that companies spend a significant portion of their time jumping through regulatory hoops instead of creating value for customers in our nation and throughout the world?

Before enactment of TCJA, U.S. multinationals held $2.6 trillion overseas.[7] This is because the United States imposed its corporate rate of 35 percent when American companies brought overseas earnings back to the United States—turning our country into a special kind of vault that is resistant to the deposit of money.

Only a handful of OECD countries impose a home-country tax on active overseas business income, and none of them do so at such a high tax rate. In this circumstance, the U.S. Government's "can-do" spirit has been unfortunate. The Federal Government essentially created a penalty for U.S. multinational companies to invest overseas profits back in the United States; meanwhile, foreign companies face no U.S. tax simply for bringing their overseas profits here. Additionally, at least part of the $2.6 trillion offshore represents value that U.S. corporations would have created entirely within the United States had the high U.S. tax rate not driven them away.

Additionally, the previous U.S. rate of 35 percent likely discouraged foreign companies from investing and creating jobs in the United States. Figure 11 contrasts foreign direct investment

since 2000 in Ireland, which has a 12.5 percent corporate tax rate, with that of the United States before reform. Surely, foreign companies would rather market American-made goods to Americans, but they were discouraged from doing so by misguided tax policy.

Figure 11

Because of the new, lower corporate tax rate of 21% and the shift to a territorial tax system on the international level, the U.S. economy will benefit from inflows of corporate cash. However this cash is used in the U.S. – whether to hire and raise the pay of workers, reduce corporate debt, pay dividends, boost stock values with buybacks,[8] or finances domestic capital investment directly – it will have the immediate benefit of boosting labor productivity, employment, and wages. According to one survey, 35 percent of foreign-earned income would go toward U.S. direct investment by the companies repatriating foreign earnings, but investors receiving cash from dividends or stock sales also can use it to invest in other companies that want to expand. This is what a win-win policy looks like.

The Obama Administration imposed higher taxes as well on businesses that are organized as pass-throughs (e.g., S-Corporations) and therefore pay individual tax rates rather than the corporate rate. The top pass-through rate went from 35 percent when President Obama took office to effectively 44.6 percent in 2013.[9] While this is only a small part of the overall picture of Government interference in the marketplace, it is telling that the Obama Administration pursued tax hikes on job creators at a time when Americans were clamoring for jobs.

The 2008-2009 recession was a watershed event, during which the U.S. business startup rate dropped precipitously and remained depressed thereafter (Chapter 1, Figure 1-1). As each startup creates an average of six jobs, and firms less than a year old are responsible for nearly all net new job creation, fewer new jobs were created.

The reasons for lower rates of entrepreneurship involve some combination of population aging, taxes, and regulation. Government officials can't do much about the former, try as we might, but the latter two fall well within our purview. While Benjamin Franklin was correct in saying that the two certainties in life are death and taxes, he wasn't urging that we embrace more of either.

Given that an aging population may be less inclined to start new businesses, the Government should ease the burdens of doing so. JEC's October 2017 hearing on tax reform[10] revealed that the complexity of the tax code could be as great a deterrent to business formation as the amount of taxes owed. The effort needed to interpret and comply with complex tax provisions inhibits and distracts entrepreneurs and imposes administrative costs on new firms that delay the point at which they can break even. High individual and corporate tax rates also send a signal to potential entrepreneurs that may discourage them from starting or continuing a business. We forget the ultimate purpose of taxation

is to provide revenue to the Government, not to cannibalize the sources of that revenue.

Tax and Regulatory Reform

The lower marginal tax rates in TCJA on corporations and pass-throughs, combined with a territorial system of international taxation, will make American companies more globally competitive, encourage companies to bring offshore profits back to the United States, and make America a more attractive place to invest. This will increase productivity and the demand for labor. Lower marginal tax rates on individual income will allow American families to keep more of what they earn, increase the incentives to work, and increase labor force participation. The CEA estimates that a reduction of the U.S. corporate rate from 35 percent to 21 percent will boost average annual household income by about $4,000 annually over the long run.[11] Together, lower marginal tax rates on business and labor will boost the economy's potential output.

Further, during the Obama Administration, a surge of regulation occurred at the absolute worst time—when the economy was recovering from a steep recession. As the economy struggled to grow, regulatory costs mounted. The supposed justification for the ever-increasing cumulative regulatory burden was that the benefits are even larger. In the Office of Information and Regulatory Affairs (OIRA) annual reports to Congress on Federal regulation, the benefits were always characterized as much larger than the costs.[12] Regulatory debates tend to focus on the validity and completeness of the tallies and ways to improve them, but they omit a crucial consideration, namely whether the claimed benefits raise GDP.

All regulatory benefits do not equally boost GDP; some may do so at more or less distant points in the future; some may do so partially; and some not at all, whereas most costs of regulation precede the benefits and are tangible. Benefits should materialize

at a sufficient pace to justify the rate of cost accumulation, and during weak economic conditions, adding more costs should be avoided.

So-called social regulation (environmental, workplace, consumer) has dominated for decades, and is credited with benefits that often are neither tangible nor tradable (although economists assign dollar values to them for cost-benefit analyses) and do not raise GDP appreciably. Regulatory costs face no budget constraint and have been accumulating much faster than the economy has grown. Congress and the current Administration are rolling back the surge of regulation from the last Administration, but to prevent a repeat in the future, regulatory cost increases should be limited to the rate of economic growth, as recommended in Chapter 4.

Based on improved tax and regulatory policy, OMB projects that over the next decade, the economy will reach a level consistent with the Obama OMB's 2013 forecast, which would be a substantial improvement over what has been called the "new normal" (Figure 12).

Figure 12

Comparative Real GDP Forecasts

A central problem with the debt buildup under the previous Administration is that it nearly doubled public debt in relation to the size of the economy, the debt-to-GDP ratio, *and* it slowed economic growth. Tax reform, together with less burdensome regulations, can accelerate economic growth and eventually help to lower the debt-to-GDP ratio.

CBO's most recent baseline forecast, which was made before TCJA was enacted, projected the real economy would average a meager 1.9 percent growth per year. From that baseline, which projected a 2027 debt-to-GDP ratio of 91.2 percent, CBO estimated that TCJA would increase the debt-to-GDP ratio to 97.5 percent by 2027, assuming no positive growth effects relative to its 2027 baseline projection of 91.2 percent. However, if the economy grows at an average annual rate of just 2.6 percent instead, then the debt-to-GDP ratio would be unchanged from the baseline (Figure 13), not even counting the dynamic effects of more tax revenue from faster growth.

Figure 13

GDP Growth and Debt-to-GDP Ratio Scenarios

Conservative estimate as it does not include debt-reducing dynamic revenue gains

Last June, CBO projected that Federal revenues will be above their historical average over the next decade, while spending will

accelerate at a much faster rate. The only two viable methods for getting the debt under control are to (1) increase the size of the economy, and (2) reform entitlement programs, which are currently projected to grow unsustainably as the population ages.

With TCJA and an improving regulatory environment, the prospects have improved for increased business investment, the return of U.S. corporate headquarters that left for foreign locations, and repatriation of U.S. multinationals' foreign earnings held overseas for tax reasons. Yet more work lies ahead to continue advancing from 49th place in the World Bank's country rankings for ease of starting a new business, among other things.[13]

Long-term Potential

For most of the postwar period, the U.S. economy was by far the largest and freest in the world, but that has changed. The European Union and Chinese economies are comparable in size to the U.S. and many countries around the world have taken steps to increase the international competitiveness of their businesses as the charts above illustrate. Removing the major growth-inhibiting features of the U.S. tax code and the Code of Federal Regulations became pressing due to America's changing position in the global economy. Other governments may not necessarily liberalize their internal markets fully but many realize that free international trade and investment put their countries at risk of becoming economic laggards if they do not free industry to compete internationally. (In this regard, some countries also try to give their businesses a competitive leg up.)

Trade. The needed response is not to resurrect barriers to trade and investment in the United States. We are all deeply concerned about unfair trade practices by bad actors in other countries. American workers want to compete fairly, but it is wrong for the Administration to move forward with new tariffs. Even with temporary exemptions for Canada and Mexico, the tariffs put

allies on other continents in limbo and jeopardize international supply chains.

International trade is our strength, especially given advancing technology, as Chapter 7 explains. The United States has a comparative advantage in bringing innovations to market, and digital trade allows even small firms to do business internationally. America has a substantial trade surplus in digital trade that promises to increase as digitization spreads. What we still call "digital" trade will encompass virtually all trade in the future if the United States successfully leads the cause for seamless commerce across borders, subject to harmonized national regulatory regimes and without national market access requirements.

Energy. Technological developments in oil and gas production provide an important perspective on U.S. ingenuity and openness to the global economy. The United States pioneered the technology that combines fracking with horizontal drilling to upend the global order in oil and natural gas markets, as the 2016 *Response* explained. Not only are U.S. producers able to meet a substantially increased portion of domestic oil and gas demand (the country remains self-sufficient in natural gas on the strength of fracking), but the end of the self-imposed crude oil export ban enabled the United States to export increasing volumes of both oil and natural gas overseas.[14] A few years ago, no one would have thought that the U.S. government would be in a position to sanction Venezuela by refusing to import its oil.

Blockchain. In response to the *Report's* study of cybersecurity, Chapter 9 discusses blockchain technology at some length and shows that the technology may develop to help secure transactions and information transmissions. The technology has many possible applications in addition to managing digital currencies, for which it is most widely known. Blockchain technology has the potential to help the economy function more efficiently and securely. However, the new technology and the possibilities it creates— including structural changes to and extensions of markets—

present regulatory and legislative challenges for the Federal Government, including disparate treatment by the States. It is important to proceed with prudence and provide proper guidance to the market, as discussed in Chapter 4 on regulation, and not prejudge and hinder technological developments. The new technology also may be attractive for Government to use, improving efficiency in its own operations.

Infrastructure. The fracking revolution was enabled by the fact that most States respect private rights to develop natural resources and regulation did not thwart expansion of supply. We must apply this lesson to the rest of the economy and remove obstacles to efficient domestic market function. Nowhere is this more obvious than with infrastructure projects. Chapter 6 addresses how the country has tied itself in knots with a permitting and regulatory process that can cause renovations of existing structures to take far longer than their original construction and can frustrate new projects, even when a given administration favors them.

Education. Education is another case where Government policies have created counterproductive incentives by enabling students to overextend themselves with student loans and predisposing them to choose college over possibly more rewarding alternative career preparation. The July 2017 JEC hearing on the large number of unfilled job openings documented the experience of many high school and college graduates, namely an inability to market their skills. College graduates are returning to community colleges in order to acquire skills employers will pay for. Some other countries prepare their students much better for the job market, and for the sake of an internationally competitive workforce, a rising standard of living, and reducing social problems, we should do the same.

Health care. Through a number of releases in the course of last year, the JEC documented the failure of the *Affordable Care Act* (ACA)—also known Obamacare—to deliver the quality of care, health service prices, and insurance enrollment promised. Others,

notably Casey Mulligan of the University of Chicago, have analyzed the economic loss from burdens and distorting incentives created by the ACA. His analysis and his testimony before the JEC in June 2015[15] provide evidence that Obamacare contributed to slow economic growth and reduced employment. Even CBO acknowledged that the ACA will reduce employment by the equivalent of two million full-time workers by 2025.[16] The *American Health Care Act* would have improved the system Congress should continue pursuing replacement reforms.

In keeping with much of the theme of this *Response*, Congress and the Administration should remove unnecessary regulatory barriers to innovation. The JEC Majority looks forward to receiving more details on the Administration's plans to reduce prescription drug costs. Medical technology is useful in saving and improving lives, reducing long-term costs, and treating chronic conditions, which among other considerations, are reasons not to apply burdensome taxes such as the medical device tax. The medical device tax operates as a tax on innovation and is particularly harmful to small companies that are not yet profitable but are striving to launch lifesaving devices. The JEC Majority recommends full repeal to spur greater innovation, maintain the U.S. competitive edge in medical technology,[17] and preserve patients' access to devices that save and improve lives. Greater coordination and portability of health records could also assist by reducing paperwork burdens and preventing medical errors (one of the possible application of blockchain technology).

Chapter 8 on health care also addresses the Nation's opioid crisis, an unprecedented epidemic of drug addiction so severe that it may be registering in national labor force participation and productivity data. The chapter discusses possible approaches, though solutions are complex and may require multi-pronged and community-based efforts. However, the Nation has coped with waves of alcoholism, drug abuse, crime, drunk driving fatalities, and other social challenges by raising public awareness and addressing them

from multiple sides. From an economic perspective, geographic and occupational labor mobility and increased labor demand could help deter people from turning to addiction. Faster economic growth, better training and education, and removing hindrances to working-age people moving to where employment opportunities exist are important parts of the solution.

CONCLUSION

The JEC Majority is convinced that the U.S. economy has room to grow faster and, belatedly, experience some of the normal bounce-back from the recession (described in Chapter 2). Market-oriented policies can release faster growth in the near term and better position the economy to counteract adverse long-term trends—particularly the aging population—so that it can reach a steady growth rate, closer to the historical average of somewhat over 3 percent. We have taken the first major step in that direction with tax reform, and we will continue to press on with other pro-growth policies.

[1] Figure 4 of the Chairman's Views of last year.
[2] Measuring economic freedom is an imprecise undertaking. A country's ranking in a given year may be a matter of index design, but Heritage has been doing this for 23 years, and changes in a county's ranking over time thus give a meaningful quantification of policy. Similar indices by other organizations, such as the Cato and Fraser Institutes, show similar declines for the United States.
[3] Other explanations included economic weakness in other countries.
[4] The Obama administration initially predicted a swift recovery based on the Keynesian belief that its stimulus package would accelerate consumption and thereby private investment and hiring. Since the 1970s, academia had largely abandoned Keynesianism, still teaching it (IS-LM) to undergraduate but not graduate students. Additional explanations for slow growth included economic weakness in other countries.
[5] Larry Summers, former National Economic Council director in the Obama White House, complained about the repair of a bridge connecting Boston and Harvard Square that began in 2012 and took five times longer than to build it a century ago. Lipson, Rachel and Lawrence H. Summers, "A Lesson on Infrastructure from the Anderson Bridge Fiasco," *The Boston Globe*, May 25,

2016.

See Also: Howard, Phillip K., "The Rule of Nobody," *Norton*, 2014.

[6] "Doing Business 2018," The World Bank, October 31, 2017.
http://www.doingbusiness.org/reports/global-reports/doing-business-2018

[7] Rubin, Richard, "Talking Taxes: How to Bring Offshore Profits Home," *Wall Street Journal*, August 10, 2017.   https://www.wsj.com/articles/talking-taxes-how-to-bring-offshore-profits-home-1502359201

[8] Cox, Jeff, "Companies have big plans for trillions in overseas cash – if tax reform ever happens," CNBC, July 13, 2017.
https://www.cnbc.com/2017/07/13/companies-have-big-plans-foroverseas-cash--if-tax-reform-ever-happens.html

[9] Due to an increase in the top rate to 39.6 percent combined with the Affordable Care Act's 3.8 percent tax on investment income and an additional 1.2 percent from the effect of limiting itemized deductions.

[10] "The Startup Slump: Can Tax Reform Help Revive American Entrepreneurship?" Hearing before the Joint Economic Committee, October 3, 2017. https://www.jec.senate.gov/public/index.cfm/hearings-calendar?ID=D47F4892-7AAF-47CA-AC0E-6ECFB04A5B96

[11] "Economic Report of the President (ERP) 2018," Council of Economic Advisers, p. 33, February 2018. https://www.whitehouse.gov/wp-content/uploads/2018/02/ERP_2018_Final-FINAL.pdf

[12] The Obama Administration's last report remained a draft, "2016 Draft Report to Congress on the Benefits and Costs of Federal Regulations and Agency Compliance with the Unfunded Mandates Reform Act," December 23, 2016.

[13] "Tracking Tax Runaways," Bloomberg, September 18, 2014.
https://www.bloomberg.com/graphics/tax-inversion-tracker/
See Also: "Doing Business 2018," The World Bank, October 31, 2017.
http://www.doingbusiness.org/reports/global-reports/doing-business-2018

[14] Oil exported is of lighter grades while imported oil s of heavier grades.

[15] "Examining the Employment Effects of the Affordable Care Act," Hearing before the Joint Economic Committee, June 3, 2015.
https://www.jec.senate.gov/public/index.cfm/hearings-calendar?ID=DA8245C3-8B5C-4DEE-BD89-C4C7F187C43B

[16] Harris, Edward and Shannon Mok, "How CBO Estimates the Effects of the Affordable Care Act on the Labor Market: Working Paper 2015-09," Congressional Budget Office, December 7, 2015.
https://www.cbo.gov/publication/51065

[17] For discussion of medical technology export opportunities, see "2016 Top Markets Report, Medical Devices," International Trade Administration, Department of Commerce, May 2016.
https://www.trade.gov/topmarkets/pdf/Medical_Devices_Top_Markets_Report.pdf

CHAPTER 1: CAUSES OF THE WEAK ECONOMIC RECOVERY

- Economic dynamism—including business formation and labor market "churn" (job turnover and relocations)—declined sharply after the recession.

- Many U.S. multinational corporations moved their headquarters and earnings to more favorable overseas tax jurisdictions.

- Weak domestic wage growth and government policies discouraged labor force participation.

- The aging of the population naturally slowed economic growth, which previous polices failed to counteract.

INTRODUCTION

The 2008-2009 recession was followed by the weakest economic recovery since World War II. In 2017, the Committee held a series of hearings to better understand the causes behind the anemic recovery. It obtained government experts including Federal Reserve Chair, Janet Yellen and Council of Economic Advisers (CEA) Chairman, Kevin Hassett, as well as, academicians Nobel laureate and Princeton University Professor, Sir Angus Deaton and Stanford University Professor, the Honorable Edward Lazear, and many others. The Committee concluded that in addition to exogenous factors—such as an aging population—more consequential factors were at play, such as poorly designed tax and regulatory policies, which have been contributing to the decline in America's business formation and relative international competitiveness, stifling market efficiency and hindering economic growth. While some issues predate the Obama Administration, the dramatic decline in business startups and

subdued economic activity from 2009-2016 suggests that post-crisis policies constrained the economy, preventing a typical robust American recovery.

For decades, dynamism—the rate and scale of reallocating an economy's resources to their most productive use—has been declining.[1] John Lettieri, of the Economic Innovation Group, explained the implications of declining dynamism for America at the Committee's April 2017 hearing, *The Decline of Economic Opportunity in the United States: Causes and Consequences*:

> *...[A] less dynamic economy is one likely to offer fewer pathways to achieving the American Dream. For workers, declining dynamism means fewer labor market opportunities and less upward mobility. For markets, it has corresponded with an era of diminished competition and greater rewards to entrenched incumbents. For regions, it means shrinking industrial bases and more profound geographic disparities.[2]*

Princeton University's Angus Deaton testified at the Committee's June 2017 hearing, *Economic Aspects of the Opioid Crisis*, about the long-term changing labor market for workers without a college degree:

> *Workers who entered the labor market before the early 70s, even without a college degree, could find good jobs in manufacturing, jobs that came with benefits and on the job training, and could be expected to last, and that brought annual increases in earnings, and a road to middle class prosperity. Such jobs have become steadily less prevalent over time"[3]*

Internationally, America's high corporate tax rate weakened our competitive stance, driving capital abroad. Additionally, scores of recent corporate inversions have occurred as firms seek a friendlier tax environment.[4] Dr. Kevin Hassett noted at the October 2017 hearing, *The Economic Outlook with CEA Chairman Kevin Hassett*, that many nations recognized the presence of international tax competition and addressed the issue with lower tax rates:

> *Countries around the world…have responded to the international outflow of capital by cutting their corporate tax rates to attract capital back.*[5]

Further, Chairman Hassett testified that the cost of corporate taxes falls partly on workers. Referencing international studies, he succinctly stated, "…high corporate tax countries have low wage growth; low corporate tax countries have high wage growth."[6]

During the Obama Administration, what was a long-term slowing of America's economic engine abruptly decelerated to the weakest economic recovery in generations. Low wages and expanded Government benefits that disappear as income rises drove many Americans out of the labor force. From 2008-2016, Americans age 15-64 left the labor force at a greater rate than all other Organization for Economic Cooperation and Development (OECD) countries.[7] Further, annual real GDP growth failed to reach even three percent during the entirety of the Obama Administration—a threshold met by every previous Administration dating back to at least Franklin D. Roosevelt.[8] The JEC Majority believes that had pro-growth policies been implemented during the previous Administration, America would have bounced back, as it did in the 1980s when annual real GDP growth averaged 4.4 percent (1983-1989), even topping 7 percent in 1984.

During the Obama Administration, America experienced a decline in both economic freedom and ease of business formation. In 2008, the Heritage Foundation and the Fraser Institute, among others, ranked the United States 5th in the world in economic freedom.[9] However, according to the most recent Fraser Institute ranking in 2015, the United States had slipped to 11th.[10] The Heritage Foundation's 2017 ranking placed the United States even further behind at 17th.[11] The relative decline is due to a lower American score and a rise in other countries' scores.

Figures 8 and 9 of the Chairman's Views illustrate the relative change in the corporate tax rate and the regulatory burden of businesses through product market regulations, two impediments to a free economy. Countries around the world have been increasing their economic freedom—becoming more competitive and attractive to business—while America has stood still until recently or, in some aspects, has moved in the opposite direction. As U.S. regulation and taxes expanded, and the relative business climate abroad improved, domestic business formation plummeted, contributing to the weak recovery. In 2008, the World Bank placed the United States 6th out of 181 countries in its ranking of ease in starting a business,[12] but by 2016—the Obama Administration's final year—it had fallen to 51st place out of 190 countries.[13] This decline helps explain the recent record low in business formation and the historically weak recovery.

The decline in business formation is a major reason for the weak economic recovery. Outside of a few geographic regions, startup rates have fallen,[14] and with declining migration rates within the United States, fewer Americans seek prosperous locations. When entrepreneurial activity is stifled, it initiates a chain reaction beginning with fewer new businesses and ending in constrained economic growth that holds living standards below their potential. Additionally, startups represent competition to established firms,

introduce more innovation, and account for most incremental hiring.[15]

For years the Obama Administration argued that the weak economic recovery was due to the severity of the recession. However, this is inconsistent with the American experience. In fact, it is well documented that the greater the severity of economic contraction, the stronger the recovery.[16] In July 2017, economists John F. Cogan, Glenn Hubbard, John B. Taylor, and Kevin Warsh wrote the following:

> *We do not share the view that the recent period of weak economic growth was simply an inevitable result of the financial crisis. Economic recoveries tend to be stronger after deep recessions, and any residual headwinds from the crisis should have long been remedied had pro-growth policies been adopted. Historically, some post-crisis periods are marked by lower economic growth, but we believe that the poor conduct of economic policy bears much of that burden.*[17]

THE RECOVERY

America's recent decline in economic freedom and ease of business formation corresponds with other troubling economic trends since the onset of the Great Recession, most notably (and alluded to earlier), a nearly 20 percent reduction in the number of newly created firms. Fewer annual business startups result in lower wages and labor force participation rates, which in turn reduces productivity and output growth, and ultimately suppress living standards. While briefly addressed in the *Report*, the Committee's Majority believes additional attention should be brought to the issue.[18]

Business Startups

The number of annual startups dropped substantially from an average of 498,000 (1977-2008) to 403,000 (2009-2015), which greatly reduced job creation and worsened labor-market slack (Figure 1-1). During the first six years of the Obama Administration—covering the most updated data—startups never reached the previous three-decade average. In fact, the Administration's best year—2015 with 414,000 startups—was lower than the preceding three decades' worst year—1983 with 434,000 startups.

Figure 1-1

Source: Census Bureau, Business Dynamics Statistics

Some startups grow to employ hundreds of workers; however, the majority will remain small. In 2014, nearly 90 percent of employers had four or fewer employees, and only 1.8 percent of employers had 100 or more workers (Figure 1-2). Thus, small business formation and easy access to labor and product markets is essential to foster a strong economy.

Figure 1-2

The declining number of startups led to a weakening of the labor market, resulting in low wages and low labor force participation.

Wages and Labor Force Participation

Firm formation tends to create more jobs, which increases labor scarcity and bids up wages. New firms less than a year old, on average, create six new jobs their first year, while existing firms represent net job losses.[19] A tighter labor market increases labor market churn—the rates of hires and separations—ultimately increasing productivity. High churn—from a tight labor market and a strong economy—increases labor productivity by relocating workers from less productive positions to more productive higher-paying positions. Conversely, low churn during hard times—from firms not replacing workers who left their job and employed workers reluctant to quit—prevent labor productivity and wage growth.[20]

Higher labor productivity from startups further increases the demand for workers, fueling additional wage growth and economic expansion. Highly productive workers produce more goods and services, generating higher sales revenue for their employer. Consequently, employees' value to firms rise; employers therefore expand employment and are willing to pay higher wages. Federal Reserve Chair Janet Yellen testified at the Committee's November 2017 hearing on the economic outlook that the "dismally slow" recent productivity growth has weakened the labor market, slowing real wage growth.[21]

The post-recession decline in job creation from the dramatic drop in startups has been exacerbated by the gradual increase in older firms' share of employment. In 2015, a record number of jobs were housed in firms at least 16 years old.[22] These firms experience little employment variation through business cycles. Thus, due to their growing presence, job growth during the current recovery has been somewhat muted compared to past recoveries. However, while changing firm demographics contributed to the slow labor market recovery, jobs foregone from fewer startups is quantitatively the larger component.[23]

The recovery's weak labor market caused an extended period of low wages. Following the onset of the Great Recession, real median personal income fell five consecutive years, the longest period of decline since the dataset began in 1974. Additionally, it took more than eight years for income to return to the pre-recession high—the slowest income recovery since at least 1974 (Figure 1-3).

Figure 1-3

U.S. Real Median Personal Income

More than an 8-year recovery period

Source: Federal Reserve Bank of St. Louis, FRED

Similarly, household income plummeted. CEA Chairman Hassett testified, "Over the past 8 years, the real median household income in the United States rose by an average of only six-tenths of a percent per year."[24] In fact, real 2012 household income was so low it matched the 1995 level.[25] Chairman Hassett explained that America's uncompetitive corporate tax rate drove multinationals to locate plants abroad, while a lower rate would incentivize capital inflows, increasing labor demand and consequently wages. The *Report* presents further evidence of low wage from 2009-2016.[26]

The weak recovery also saw the total labor force participation rate decline; and while partly due to the aging population, the decline accelerated in recent years. From the Great Recession's December 2007 business-cycle peak to the June 2009 trough, labor force participation rate fell only slightly, from 66 to 65.7 percent.[27] However, once the recovery began, the rate fell an additional 3 full

percentage points, to 62.7 percent, in May 2017. This was far lower than predicted in the immediate aftermath of the recession.[28]

The prime-age labor force participation rate—a measurement that is little affected by the aging of the population—also dropped. It averaged 83.4 percent from 1990-2008 yet only 81.5 percent from 2009-2016. Not until 2016—the year that real median personal income returned to the pre-recession level—were workers drawn back into the labor force, causing the participation rate for ages 25-54 to grow for the first time since 2009 (Figure 1-4).[29] However, despite the uptick, the rate remains near a 30-year low.

Figure 1-4

While America's working-age labor force participation rate collapsed, most other developed countries saw growing participation rates. The OECD compiles international data on labor force participation rates for workers age 15-64. The aggregate participation rates of OECD countries increased 1.3 percent from 2008-2016. Over that same period, only eight of the

thirty-five countries saw their rates fall. Of those, America fell the most with a -3.1 percent change (Figure 1-5).

Figure 1-5

America's weak labor market drove many workers out of the labor force. In addition to low wages and labor force participation, the weak labor market harms the economy through low productivity and output growth.

Productivity and Output Growth

An economy abundant with business startups and a strong labor market is more dynamic, tends to raise labor productivity—output per hour worked—and consequently output (GDP) growth. High economic growth translates into more goods and services, lower prices, and more and varied job opportunities for all Americans. Alternatively, a less dynamic and low-growth economy trends toward stagnation, offering fewer choices to consumers and fewer prospects for workers.[30] Diminished business startups and a weak labor market during the Obama Administration have contributed to low labor productivity growth and an anemic economic recovery. The current cycle's level of labor productivity and GDP growth falls far short of past business cycles (Figure 1-6).[31] Not only is the recovery the slowest since World War II, but America "…is experiencing the worst five years of productivity ever measured outside of a recession."[32] In fact, 2016 saw negative annual productivity growth for the first time in more than three decades.[33]

Figure 1-6

Source: Bureau of Labor Statistics, Bureau of Economic Analysis

Federal Reserve Chair Yellen testified about America's declining dynamism and recent low level of productivity growth:

> *We are also seeing signs of less dynamism. The process of creative destruction of new firms, innovative firms expanding at the expense of those that are less innovative, that process seems to have slowed, and I think some productivity growth is associated with that.*[34]

Similarly, Stanford University economist John Cochrane explains how new companies that displace older ones typically increase productivity:

> *...[P]roductivity comes from new ways of doing things: New ideas, at heart; new inventions, new products, new processes, new technologies; new ways of organizing companies; new and better skills among workers.*[35]

By the end of the Obama Administration, GDP growth projections were far below traditional American levels. In mid-2017, both the Congressional Budget Office (CBO) and the Federal Reserve (Fed) projected that GDP growth will remain significantly below the post-World War II average of 3.4 percent in the coming years. Following small fluctuations around two percent through 2021, CBO and the Fed projected annual growth to level off at 1.9 percent.[36] The effect of lower GDP growth on American households is lower living standards.

Living Standards

Higher productivity growth, wages, and GDP growth from more business startups improve Americans' material well-being through financially stronger consumers and the availability of

more goods and services. Since 2009, material well-being—as measured by real per capita GDP—has been growing at a meager 0.7 percent, which is less than half the two percent rate of the preceding three decades. Additionally, during the entirety of the Obama Administration, real per capita GDP growth failed to reach the three-decade average growth rate of two percent (Figure 1-7).

Figure 1-7

Business dynamism has been gradually declining for decades[37], but a dramatic weakening began at the onset of the current recovery, from which it failed to rebound. The Obama Administration attributed this failure to the severity of the Great Recession and its origin in the financial sector—rather than Obama Administration policies, but this blame shift is unconvincing. The following excerpts from the paper cited above by Cogan, Hubbard, Taylor, and Warsh summarize the reasons:

Focused primarily on "stimulus" in the short-term, the conduct of economic policy in the post-crisis years did little to reset expectations higher for long-term growth. That policy failure restrained those expectations, adversely affecting consumption and, especially, investment spending.

Economic theory and historical experience indicate economic policies are the primary cause of both the productivity slowdown and the poorly performing labor market. High marginal tax rates, especially those on capital formation and business enterprises, costly new labor market and other regulations, high debt-financed government spending (largely to fund income transfer payments), and the lack of a clear monetary strategy have discouraged real business investment and reduced both the supply of—and the demand for—labor.[38]

INCREASED HURDLES FOR BUSINESS FORMATION

The private sector has been facing headwinds for years, which has reduced business startups and slowed the economic recovery. Several contributing factors to declining business formation and the weak recovery include: expanding regulation; high and complex taxes; fewer workers able and willing to relocate—either to start a businesses or for better job opportunities; and rising student debt. An aging population is a factor, as may be the opioid crisis, but so is the design of social safety net programs that discourage gainful employment.

Expanding Regulation

Regulations are imposed by all levels of government, creating a complex web of business rules. Most rules are formulated without cost-benefit analysis and over time have accumulated to a massive aggregate burden on the economy. The legacy of the Obama Administration is substantial new Federal regulations added to the existing behemoth of accumulated Federal, State, and local rules that discourage business formation and expansion; hinder market efficiency; and slow economic growth.

At the State and local level, anti-business policies deter business startups and expansions. Local land-use regulations such as storm-water management, parking requirements, and mandatory setbacks, among others, add costs and delays to new business development projects and are known to reduce startups.[39] Similarly, Stanford University Economics Professor Edward Lazear's testimony submitted for the Committee's April 2017 hearing, *The Decline of Economic Opportunity in the United States: Causes and Consequences*, explained the importance of business-friendly State labor policies on economic wellbeing.[40] The former CEA chairman's testimony pointed out that from 2000-2015, States with the most positive business climate grew fastest, specifically those with low minimum wages and right-to-work laws; further, employment grows twice as fast in States with market-oriented labor policies. Also, occupational licensing requirements, which have grown from 5 percent of American workers in 1950 to about 29 percent in 2008, act as an entry barrier to many industries.[41] For some occupations, States without license requirements experience a 20 percent faster employment growth than in states requiring licenses.[42]

White Castle System's Jamie Richardson testified in 2016 that restaurants throughout the country have experienced

"…unchecked growth of regulatory barriers and burdens while facing unprecedented economic challenges." He also cited several Federal regulations including the *Affordable Care Act*, overtime regulations, *American with Disabilities Act* liability, Occupational Safety and Health Administration rules, and Environmental Protection Agency restrictions as specific examples of recent regulatory overreach.[43]

The Council of Economic Advisers pointed to an example of deregulation's effectiveness on the level of business formation in Europe.[44] In 2005, Portugal implemented its "On-the-Spot-Firm" program that reduced incorporation fees and the incorporation time delay from months to as little as one hour. The program saw business startups and new-firm job formation increase by 17 and 22 percent—a "…statistically significant, economically meaningful…" increase; the affected firms were typically small, owned by less-educated entrepreneurs, and in low-tech sectors (agriculture, construction, retail trade).[45] Municipalities that opened On-the-Spot-Firm shops saw an annual average increase of 4.3 more firms created within each industry.[46]

Through Executive Orders and legislation, the Trump Administration and Congress have reduced the Federal regulatory burden. The JEC Majority believes that these reductions revive economic activity, benefitting all Americans. U.S. States wishing to encourage entrepreneurship may similarly benefit from streamlining and shortening their firm formation process. See Chapter 4 of the *Response* for more on regulation.

High and Complex Tax Burden

High tax rates and compliance costs reduce after tax-profits, which discourages entrepreneurship. During the Obama Administration, some States had marginal individual tax rates in excess of 50

percent.[47] Further, Americans spent 8.9 billion hours filling out tax forms in 2016, costing the economy $409 billion in lost productivity.[48] Tax Foundation President, Scott A. Hodge's testimony at the Committee's October 2017 hearing, *The Startup Slump: Can Tax Reform Help Revive American Entrepreneurship*, included the following recommendation:

> *...[Y]ou should aim to get the tax code out of the way of entrepreneurs by making it simpler, less burdensome, and eliminating its anti-growth biases. Get rid of the success taxes and fix the quirks in the code that punish firms as they grow, and then tax them in a normal fashion when they succeed.*"[49]

Prior to the *Tax Cuts and Jobs Act*, America's Federal tax system deterred business formation in several ways. Many small firms that were structured as pass-through businesses paid the individual income tax rate. That is, their business activity was reported on their 1040 tax form as individual income. In 2013, the top marginal income tax rate rose from 35 percent to 39.6 percent. The *Affordable Care Act* added a 3.8 percent investment income tax that affects owners who are not active in the business, and another penalty for high earners added an effective 1.2 percent, bringing the top effective marginal rate of small businesses to 44.6 percent.[50] Additionally, business owners must pay the employer's portion of payroll taxes to fund Social Security and Medicare, as well as pay any State income tax, which ranges by State from zero to 13.3 percent.

Internationally, over the past few decades, U.S. businesses have lost some competitive advantage. While America's corporate tax rate remained relatively constant, other countries lowered theirs. Entrepreneurs from around the world must choose a country to

locate their business. The decision is based on a number of factors, including the corporate tax rate. The United States had the highest corporate tax rate of all industrialized countries in the world at 39 percent (including the 35 percent Federal rate and average State taxes), and was an outlier among competing countries in that it heavily taxes income earned outside its borders.[51] Multinational firms often preferred to headquarter or earn profits in a country such as Ireland instead of the United States because it has one of the lowest corporate tax rates in the world at 12.5 percent; this was previously roughly a third of the U.S. rate.[52] CEA Chairman Hassett testified:

> ...[I]t was not our actions on tax policy that necessarily harmed us, it is our inaction...the rest of the world cut their corporate taxes, and that made their countries more attractive for the location of multinational plants than our country, and we saw the activity move overseas...[53]

Fortunately, the *Tax Cut and Jobs Act* lowers both individual and corporate tax rates. Harvard University economist Robert J. Barro wrote the following in a January 5, 2018, *Wall Street Journal* op-ed following the Act's passage:

> ...[C]utting income taxes on individuals will power economic growth in the short run, and reforming them for businesses will do the same over the long haul. Together they add up to more investment, increased output and higher wages for millions of Americans.[54]

While more work needs to be done, the JEC Majority sees the *Tax Cut and Jobs Act* as an important step toward improving the business environment for entrepreneurs. U.S. States should also

consider lowering and simplifying income taxes. See Chapter 3 of the *Response* for more on taxes.

Fewer Workers Relocating

Americans have historically relocated for better opportunities by moving to high labor-productivity and high nominal-wage locations. However, in recent years, Americans have been relocating at the lowest rate on record. From 1965-1971, an average of 3.4 percent of the population annually migrated across state lines; from 2010-2016, average interstate relocations fell to 1.6 percent (Figure 1-8).

Figure 1-8

Scholars have identified several contributing factors to the decline in interstate migration:

- Some cities have adopted land-use regulations that limit housing supply, preventing in-migrants.[55]

- Today, regional differences in income are to a greater degree reflected in housing prices—due largely to tight land-use regulation—reducing net-of-housing income and relocation benefits.[56]
- Since most occupational licenses do not transfer across states lines, the relicensing cost of time and money acts as a deterrent to those seeking to start businesses in other states.[57]
- Some homeowners have experienced so-called "house lock" from underwater mortgages—mortgages that exceed home market value—making it financially difficult to sell their home to relocate.[58]
- Interstate migration is inversely related to age; thus, as Americans age, migration falls.[59]

There are many reasons Americans are unable to relocate at past rates, including the unintended consequence of government policies—also discussed in the *Report*.[60] Yet whatever the reason, immobility is a barrier to better employment opportunities for workers and better markets for producers, which decreases labor market churn and dynamism, constrains entrepreneurship, and therefore reduces productivity and GDP growth. The JEC Majority believes that Federal, State, and local government policies that hinder relocation should be removed or reformed in order to help America reach its full potential.

Higher Education and Rising Student Debt

Since the end of World War II, the government has promoted and supported higher education. So-called white-collar work often could benefit from a higher level of general education beyond high school. A college degree also signaled desirable employee characteristics to employers. Now that about one-third of

American adults have a bachelor's degree, there are signs that investment in a college education may be encountering diminishing returns, as college graduates face difficulty finding jobs in their field of study.[61] Inducing even more students to attend college may mean that fewer are well-suited or motivated to perform and fewer will find careers whose earnings provide an adequate return on a college investment. According to Dr. Harrison, President of Columbus State Community College in Columbus, Ohio, the demand for associate degree graduates grew three times the rate of that for college graduates, and an overwhelming majority of jobs will require technical skills or associate degree level preparation, while only 33 percent of jobs will require a bachelor's degree.[62] He testified at the JEC July 2017 hearing, *A Record Six Million U.S. Job Vacancies: Reasons and Remedies* that some college graduates return to community college to earn certifications in marketable skills.

For decades, college and university tuition has been rapidly rising, and from 2007-2017 Federal student aid has increased 165 percent (Figure 1-9). Purdue University President, Mitchell E. Daniels testified in 2015 that tuition prices have increased by "…225 percent over the past 30 years, after inflation."[63] The 2017 *Response* explains that easy access of subsidized credit to nearly all college students allows colleges and universities to easily raise tuition.[64] This phenomenon was famously presented in a 1987 *New York Times* op-ed titled, "Our Greedy Colleges," by William Bennett, then-Secretary of Education.[65] In the article he stated, "If anything, increases in financial aid in recent years have enabled colleges and universities blithely to raise their tuitions, confident that Federal loan subsidies would help cushion the increase."

Figure 1-9

Federal Student Aid

Source: Department of Education Federal Student Aid

Additionally, some Federal student loans are structured such that a substantial portion need not be repaid, incentivizing student debt accumulation. Examples from the 2017 *Response* show that Obama Administration loan policies cap monthly loan payments at 10 or 15 percent of discretionary income; following 20 years of payments, the borrowers outstanding debt is forgiven and the balance due is transferred to taxpayers.[66] These Obama Administrations policies incentivize students to maximize debt— borrowing irresponsibly and exacerbating the problem of high student debt—leaving taxpayers responsible for a significant portion of the debt.

The implication of a high student debt level at the time of graduation is a decline in business formation. Research shows that there is a "…significant and economically meaningful negative correlation between changes in student loan debt and net business

formation…" The correlation is strongest for small firms—those with one to four employees.[67]

The JEC Majority believes that higher education financing reform will benefit students, taxpayers, and strengthen America's economy. See Chapter 5 of the *Response* for a more detailed discussion of education policies.

Other Contributing Factors

The rapid expansion of drug abuse is also keeping some people out of the labor force. Deteriorating labor market opportunities that lead to worsening working and personal outcomes, as well as the easy access to opioids, fuels drug abuse.[68] More than a year ago, the *New York Times* published "Hiring Hurdle: Finding Workers Who Can Pass a Drug Test." Employers across the country are having difficulty finding applicants who can pass a drug test.[69] See Chapter 8 of the *Response* for a more detailed discussion of the opioid crisis.

Artificial trade barriers also dampen growth. Digital trade has been growing rapidly in recent years and America is leading the way. See Chapter 9 of the *Response* for more on blockchain. However, challenges to the smooth international flow of goods and funds may prevent trade from reaching its most efficient level. George Mason University's Daniel Griswold stated at the Committee's September 2017 hearing, *The Dynamic Gains from Free Digital Trade*:

> *Now despite the dynamic growth and benefits of digital trade, significant barriers remain to prevent Americans from reaping its full advantages.*[70]

America's generous social safety net may also be keeping some people out of the workforce. University of Chicago economist

Casey Mulligan writes in *The Redistribution Recession* that subsidies to low-income households almost tripled after 2007, reducing the reward to work by about $5,600 from 2007-2009.[71] Manhattan Institute's, Diana Furchtgott-Roth testified at the Committee's July 2017 hearing, *A Record Six Million U.S. Job Vacancies: Reasons and Remedies* that America's labor force participation rate has been falling in part due to the expansion of Government benefits, including expanded eligibility for disability insurance and food stamps.[72] Hoover Institute's Timothy Kane testified at the Committee's April 2017 hearing, *The Decline of Economic Opportunity in the United States: Causes and Consequences* that "…maybe the safety net is a little bit too safe, the paternalism is too comfortable."[73]

Dr. Lazear's submitted testimony refers to research showing that an aging population decreases the employment rate and business formation across countries.[74] Obama Administration economists invoke the retirement of the Baby Boom generation as a major reason for the weak economic recovery, but policies of the Obama Administration did nothing to counteract the economic growth effects of less favorable demographics. That challenge should be an impetus to tax and regulate less rather than more.

CONCLUSION

Established entrepreneurs like Bill Gates (Microsoft) or Jeff Bezos (Amazon) may not be deterred by Government regulations and taxes, but many who would like to open a restaurant, barbershop, or lawn care company are. Similarly, professionals such as doctors, dentists, and lawyers may opt to work for hospitals or corporations rather than start their own practice if government policies makes doing so too onerous. These are the types of firms that employ four or fewer people, and for them, regulation, taxes, relocation costs, high student debt, and other mundane obstacles

matter very much. When their owners give up, the economy forgoes value and job creation.

Efforts by the Trump Administration and Congress to reduce burdensome regulation and reform the Federal tax code are important steps toward reviving business startups, fueling economic growth, and lifting living standards for hard-working Americans.

Recommendations

The Committee's Majority encourages the Trump Administration and the Congress to continue working together to expand the economic liberty that fuels America's growth engine at the Federal level, and encourages State and local governments to follow suit:

- ➢ Reestablish America as the premier place for private investment and entrepreneurship;

- ➢ Raise the labor force participation rate of the prime working-age population;

- ➢ Focus the education system on developing marketable skills and reform the financing higher education; and

- ➢ Recognize the aging population as a challenge to economic growth and remove unnecessary hindrances to labor force growth and business expansion

CHAPTER 2: MACROECONOMIC OUTLOOK

- The *Report* provides a thorough assessment of the state of the economy and an analysis of the Administration's projected growth effects.

- The Administration anticipates three percent average annual growth for the next ten years with its agenda implemented, compared to a much more subdued 2.2 without its reforms.

- This *Response* chapter reviews alternative explanations to the common narratives about the slow economic recovery, and provides an encouraging assessment of America's short- and long-terms economic growth prospects.

OVERVIEW

From 2008-2016, inflation adjusted (real) GDP growth averaged only 1.3 percent compared to 2.9 percent from 1990-2007. The inflation rate slowed to a 1.5 percent average from 2008-2016, down from 2.3 percent from 1990-2007.[75] Slow growth and unusually low inflation have been described as the "new normal."

Supporters of this view argue that lower productivity growth and labor force participation rates are inevitable, and they believe tax and regulatory policies cannot improve the slump. Further, many of them point to a low headline unemployment rate and an output gap some estimate has closed to assert that the recently enacted *Tax Cut and Jobs Act* (TCJA) could cause the economy to "overheat" by overstimulating demand.

Conversely, the Majority members of the Committee contend that government policies artificially constrained economic potential after the 2008-2009 recession, and concur with CEA's

endorsement of "an agenda for returning the American economy to its full growth potential."[76]

The first section of this chapter explores factors that constrained the demand side of the economy, and the second section examines factors that constrained the supply side. The former discusses unusually low inflation rates and the latter below-average economic growth rates—suggesting that the U.S. economy has room to grow faster. The next section assesses recent economic developments, and the outlook for 2018 and beyond. The final section contains a summary, conclusions, and recommendations for policymakers going forward.

Because monetary policy plays an important role in affecting the economic outlook, the Committee holds an annual hearing with the Federal Reserve Chair. Therefore, the *Response* discusses monetary policy issues at greater length than the *Report*. The *Response* does not opine on the efficacy of the Fed's two percent inflation target but offers some alternative views for why inflation has chronically fallen short of the target and how this might affect the economic outlook.

DEMAND-SIDE CONSTRAINTS

Since 2008, inflation has consistently undershot the Fed's two percent symmetric inflation target as Figure 2-1 shows. "Symmetric" signifies that two percent is an average and not a ceiling; thus the Fed will tolerate inflation above and below its two percent target. In what follows, it is important to distinguish between the Fed's inflation target and its Federal (fed) funds rate target. Changing the latter (an instrument) is a means to achieving the former (an objective).

As the *Report* notes, "Inflation is below or barely at target levels in most advanced economies, despite a decade's worth of accommodative, unconventional monetary policy measures."[77]

The *Report*[78] and Federal Reserve officials[79] find low inflation rates "puzzling," especially given the low unemployment rates. The "Phillips Curve" theory of price inflation posits that low unemployment rates drive up wages, which leads firms to raise prices to offset rising costs. The Committee Majority explores alternative explanations for below-target inflation. Notably, monetary policy may not have been as "accommodative" as commonly perceived.

Figure 2-1

Inflation Systematically Short of Fed Inflation Target

Credit Policy, Not Monetary Policy

"Monetary policy easing" is conventionally characterized by Fed reductions in its interest rate target implemented by the purchase of short-term Treasury securities with newly-created bank reserves, colloquially known as "printing money." If banks lend more funds to consumers and businesses as a result, this will stimulate nominal spending (i.e., "aggregate demand"),[80] which can increase employment, output, and inflation in the short run, but only drives inflation higher in the long run.

While such an operation leaves the market and entities such as Government-sponsored entities (GSEs) (e.g., Fannie Mae and Freddie Mac) to determine where credit should be allocated, unconventional "credit easing policies" channel credit toward particular market segments and place financial assets other than the traditional short-term Treasury bills on the Fed's balance sheet.

In September 2007, subprime mortgage market stress and concern over its implications for the economy compelled the Fed to lower its target for the fed funds rate—the short-term interest rate at which banks and a few other financial institutions lend funds overnight—from 5.25 percent to 4.75 percent.[81] The Fed further lowered its fed funds rate target at varying intervals and degrees until settling at two percent on April 30, 2008, where it remained until October 8, 2008. The Fed also embarked on "credit easing policy" when it introduced an emergency lending facility[82] designed to support private financial intermediation (i.e., borrowing and lending). Federal Reserve Bank of Richmond senior economist Robert Hetzel succinctly described the unusual credit policy:

> *Policies to stimulate aggregate demand by augmenting financial intermediation provided an extraordinary experiment with credit policy as opposed to monetary policy.*[83]

The Fed bought financial instruments from particular credit markets segments to direct liquidity toward them, which had the effect of injecting reserves into the banking system. This action alone would incidentally ease monetary conditions, but the Fed then sold Treasury securities from its portfolio to withdraw those reserves from the banking system (called "sterilization"), thereby restricting nominal spending growth. Figure 2-2 shows that before 2008, the Fed's balance sheet consisted predominantly of Treasury securities (generally of shorter maturities) and Federal Reserve

Notes (i.e., paper money), and that bank reserves were a miniscule part of the Fed's liabilities.

Figure 2-2

As Figure 2-2 shows, during the first three quarters of 2008 the composition of Fed assets changed such that emergency lending grew, while holdings of Treasury securities shrank, leaving the size of the Fed's balance sheet nearly unchanged.

Furthermore, despite the low level of the Fed's fed funds rate target, monetary policy arguably remained relatively tight, as monetary economist Scott Sumner notes in the context of a 2003 Ben Bernanke speech:

> *Bernanke (2003) was also skeptical of the claim that low interest rates represent easy money:*
>
> > *[Bernanke:] As emphasized by [Milton] Friedman… nominal interest rates are not good indicators of the stance of monetary policy…The real short-term interest rate…*

> *is also imperfect…Ultimately, it appears, one can check to see if an economy has a stable monetary background only by looking at macroeconomic indicators such as nominal GDP growth and inflation.*
>
> *Ironically, by this criterion, monetary policy during the 2008-13 was the tightest since Herbert Hoover was President.*[84]

A Subtle Change to Fed Policy Implementation

During the week of September 15, 2008, investment bank Lehman Brothers failed, followed by a subsequent run on money market mutual funds.[85] The Fed's emergency lending spiked with a corresponding injection of reserves (Figure 2-3), for which the Fed was unwilling to sell more of its Treasury security portfolio to sterilize.

At the Fed's behest, the Treasury Department sold "special treasury bills" to the public and deposited the proceeds with the Fed.[86] As purchase of the treasury bills would require buyers to transfer funds from their banks to the Treasury Department, this drained reserves from the banking system. The Treasury Department, by depositing the proceeds with the Fed, was effectively removing dollars from circulation, sterilizing the Fed's burgeoning emergency lending programs and helping to keep the fed funds rate from trading below the Fed's target. The Fed was attempting to keep interest rates from falling out of greater concern for inflation rising than for the deteriorating economic outlook.[87]

Despite these efforts the fed funds rate still fell below the Fed's target. The Treasury Department, approaching the debt ceiling, grew reluctant to increase its deposits with the Fed. This prompted the Fed to ask Congress for authority[88] to pay interest on excess

reserves (IOER)[89] to incentivize banks to deposit reserves at the Fed and prevent the fed funds rate from falling below the Fed's target (see Appendix 2-1 for the original impetus behind IOER).

As then Federal Reserve Chairman Ben Bernanke wrote in his memoirs:

> *When banks have lots of reserves, they have less need to borrow from each other, which pushes down the interest rate on that borrowing—the federal funds rate.*
>
> *Until this point we had been selling Treasury securities we owned to offset the effect of our [emergency] lending on reserves (the process called sterilization). But as our lending increased, that stopgap response would at some point no longer be possible because we would run out of Treasuries to sell. At that point, without legislative action, we would be forced to either limit the size of our interventions… or lose the ability to control the federal funds rate, the main instrument of monetary policy… [By] setting the interest rate we paid on reserves high enough, we could prevent the federal funds rate from falling too low, no matter how much [emergency] lending we did.[90]*

Thus, by paying IOER at rates above the fed funds rate, the Federal Reserve could expand its balance sheet size to ease credit conditions for selected market segments. At the same time, it could keep broader monetary conditions from easing by encouraging banks to hold newly created funds as excess reserves through the payment of IOER.

Why Emergency Lending Programs and "Quantitative Easing" Were Not Inflationary

To help overcome the recession and the ensuing weak recovery, the Fed undertook three large-scale asset purchase (LSAP) programs, more commonly known as "quantitative easing" or "QE," between November 2008 and October 2014, which involved the Fed purchasing longer-term Treasury securities and GSE-issued mortgage-backed securities (MBS) rather than its normal purchases of short-term Treasury securities.[91] This led to a substantial increases in bank reserves, which is shown in Figure 2-3, along with the "money multiplier." The latter measures how increases in reserves and currency by the Fed multiply into broader forms of money (e.g., checking and savings accounts), which propel nominal spending.

Figure 2-3

Had the money multiplier remained equal to its pre-recession level, then given the Fed's increases in reserves from its LSAPs, nominal spending would have been nearly $50 trillion at the end

of 2017 instead of just under $20 trillion, and most certainly would have been inflationary. However, LSAPs did not even result in nominal spending returning to its pre-2008 trend, as shown in Figure 2-4.

Given that inflation remained below the Fed's two percent inflation target, monetary conditions have been relatively tight compared to the period preceding the 2008-2009 recession when measured by outcomes rather than instruments (the low fed funds rate target and an enlarged balance sheet).

Figure 2-4

The Fed was clear from the outset that it would undo its LSAPs eventually[92] (i.e., remove from circulation the money it created in the future). The temporary nature of the policy discouraged banks from issuing more long-term loans. Alternatively, as economist Tim Duy pointed out during the inception of the Fed's first LSAP program:

Pay close attention to Bernanke's insistence that the Fed's liquidity programs are intended to be unwound. If policymakers truly intend a policy of quantitative easing to boost inflation expectations, these are exactly the wrong words to say. Any successful policy of quantitative easing would depend upon a credible commitment to a permanent increase in the money supply. Bernanke is making the opposite commitment—a commitment to contract the money supply in the future.[93]

Sumner (2010),[94] Beckworth (2017),[95] and Krugman (2018)[96] observe similar issues.

Furthermore as Sumner (2010),[97] Feldstein (2013),[98] Beckworth (2017),[99] Selgin (2017),[100] and Ireland (2018)[101] note, payment of IOER at rates competitive with market rates led banks to hoard the reserve, which contributed at least partially to the collapse of the money multiplier (Figure 2-3).

Regarding IOER, former Federal Reserve Vice Chairman Alan Blinder advised in 2012:

I've been urging on the Fed for more than two years: Lower the interest rate paid on excess reserves. The basic idea is simple. If the Fed reduces the reward for holding excess reserves, banks will hold less of them—which means they will have to find something else to do with the money, such as lending it out or putting it in the capital markets.[102]

He later observed in 2013:

If the Fed charged banks rather than paid them, wouldn't bankers shun excess reserves? Yes, and that's precisely the point. Excess reserves sitting idle in banks' accounts at the Fed do nothing to boost the economy. We want banks to use the money.[103]

In the same article, he elaborated:

The financial crisis short-circuited this process. As greed gave way to fear, bankers decided to store trillions of dollars safely at the Fed rather than lend them out. High-powered money [reserves and currency] became powerless money.

The Fed compounded the problem in October 2008 by starting to pay interest on reserves. And these days, the 25-basis-point IOER looks pretty good compared with most short-term money rates. If banks were charged rather than paid 25 basis points, they would find holding excess reserves a lot less attractive. As some of this excess central-bank money became 'high-powered' [i.e., propelled nominal spending growth through the money multiplier] again, the Fed would want less of it. So its balance sheet could shrink.

The payment of IOER and the transitory nature of LSAPs acting to neutralize the monetary policy transmission mechanism explains, at least partially, the consistent undershooting of the Fed's two percent inflation target. The Fed was effectively pushing the gas pedal and the brake pedal at the same time.

Legislative Issues Related to IOER

The law specifies that IOER be paid at "rates *not* to exceed the general level of short-term interest rates."[104] However, from 2009-2017, the IOER rate exceeded the effective fed funds rate 100 percent of the time, the yield on the 3-month Treasury bills 97.2 percent of the time, and the yield on 3-month nonfinancial commercial paper 82.1 percent of the time (Figure 2-5). The Fed is including its own discount rate (the primary credit rate) in the general level of short-term interest rates to demonstrate compliance with the law.[105]

In connection to IOER, Representative Jeb Hensarling, Chairman of the House Financial Services Committee, stated:

> *[It] is critical that the Fed stays in their lane. Interest on reserves – especially excess reserves – is not only fueling a much more improvisational monetary policy, but it has fueled a distortionary balance sheet that has clearly allowed the Fed into credit allocation policy where it does not have business.*
>
> *Credit policies are the purview of Congress, not the Fed. When Congress granted the Fed the power to pay interest on reserves, it was never contemplated or articulated that IOER might be used to supplant FOMC. If the Fed continues to do so, I fear its independence could be eroded.*[106]

Figure 2-5

IOER Rate *Exceeds* Short-Term Interest Rates

Legend:
- IOER rate
- 3 month commercial paper yields
- Fed funds rate, effective
- 3 month Treasury bill yields

Y-axis: 0.00%, 0.25%, 0.50%, 0.75%, 1.00%, 1.25%, 1.50%, 1.75%
X-axis: 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018

Source: Federal Reserve/Haver Analytics, weekly data, extending to February 28, 2018

Views Cautioning on Use of Unconventional Monetary Tools

Noting that the large quantity of reserves produced by the Fed contributed to the fed funds rate trading at or below the IOER rate, John Taylor of Stanford University's Hoover Institution said:

> [W]e would be better off with a corridor or band with a lower interest rate on deposits [IOER] at the bottom of the band, a higher interest rate on borrowing from the Fed [the discount rate] at the top of the band, and most important, a market-determined interest rate above the floor and below the ceiling… We want to create a connect, not a disconnect, between the interest rate that the Fed sets and the amount of reserves or the amount of money that's in the system. Because the Fed is responsible for the reserves and money, that connection is important. Without that connection,

you raise the chances of the Fed being a multipurpose institution.[107]

The preceding observations and alternative views merit consideration. In particular, Hetzel (2009) states:

Restrictive monetary policy rather than the deleveraging in financial markets that had begun in August 2007 offers a more direct explanation of the intensification of the recession that began in the summer of 2008.[108]

Furthermore, the Fed's new operating procedures (a large balance sheet and IOER) may not be conducive to maintaining full employment and price stability, as Taylor (2009) noted:

[P]aying interest on excess reserves gives the Fed an additional tool. However, this tool enables the Fed to be more like a discretionary multipurpose institution rather than the rule-like limited purpose institution that has delivered good policy in the past and that can deliver good policy in the future.[109]

Also, future Fed policy may be constrained in some ways by past policy actions, which may not be conducive toward maintaining full employment and price stability. As Bill Nelson, former deputy director of the Federal Reserve Board's Division of Monetary Affairs and an attendee of FOMC meetings, noted of the Fed's internal debate over its third LSAP program:

It is worth keeping in mind that the Fed didn't make an explicit decision to keep its balance sheet so large for so long because doing so would support efficient monetary policy [e.g., the one that maintains full employment and price stability].

Instead, the Fed fell into its current situation because the original plan to drain excess reserves and sell assets became untenable once people realised selling such a large portfolio so quickly would generate large losses.[110]

SUPPLY-SIDE CONSTRAINTS

Reasons for the U.S. Economy's Sluggish Growth

Larry Summers, former National Economic Council Chairman during the Obama Administration, succinctly described the economy's performance since the 2008-2009 recession:

[E]ssentially all of the convergence between the economy's level of output and its potential has been achieved not through the economy's growth, but through downward revisions in its potential.[111]

Figure 2-6 shows how real GDP has performed relative to projections of potential real GDP over time. In August 2007, CBO projected that potential real GDP—the maximum sustainable level of output an economy can produce—would be nearly $2.6 trillion more than it actually was by 2017's end.

Figure 2-6

The severity of the 2008-2009 recession has been offered as an excuse for the U.S. economy's failure to recover. However, as Chapter 1 of this *Response* and the *Report* points out, this claim does not square with experience.[112]

Research by Nobel laureate economist Milton Friedman concluded that the more severe an economic contraction was, the sharper the recovery would be (Friedman 1988).[113] Economists Robert Barro and Tao Jin examined 185 distinct macroeconomic crises (including ones associated with severe financial crises, such as during the Great Depression).[114] Barro succinctly summarized their findings in a 2016 *Wall Street Journal* op-ed:

> *On average, during a recovery, an economy recoups about half the GDP lost during the downturn. The recovery is typically quick, with an average duration around two years. For example, a 4% decline in per capita GDP during a contraction predicts subsequent recovery of 2%,*

implying 1% per year higher growth than normal during the recovery. Hence, the growth rate of U.S. per capita GDP from 2009 to 2011 should have been around 3% per year, rather than the 1.5% that materialized.

Arguing that the recovery has been weak because the downturn was severe or coincided with a major financial crisis conflicts with the evidence, which shows that a larger decline predicts a stronger recovery. Moreover, many of the biggest downturns featured financial crises. For example, the U.S. per capita GDP growth rate from 1933-40 was 6.5% per year, the highest of any peacetime interval of several years, despite the 1937 recession. This strong recovery followed the cumulative decline in the level of per capita GDP by around 29% from 1929-33 during the Great Depression.[115]

In the post-World War II era, the second most severe U.S. recession was the double-dip recession of 1980 and 1981-82, in which the unemployment rate reached a record high of 10.8 percent. The Reagan Administration's response was to streamline regulation, reform the tax code, and advocate sound monetary policy. In the four quarters after the recession's trough in the fourth quarter of 1982, real GDP growth registered annualized growth rates of 5.3, 9.4, 8.1, and 8.5 percent.[116]

President Obama's Office of Management and Budget (OMB) initially also expected a strong recovery from the recession (Figure 2-7), consistent with the empirical research cited above. But a robust recovery never materialized, and its expectations were gradually revised downward.

Figure 2-7

The subsequent sections show that abrupt breaks from trend occurred in key determinants of economic growth such as labor force participation rates, capital investment, and labor productivity. This suggest a failure of policy to promote recovery.

"Quantitative Easing" Increased the Government's Footprint in Capital Allocation

Prior to 2008, nearly every dollar of deposits translated into a dollar of private bank loans and leases. Although lending did rebound in 2008's aftermath, a sizeable portion of bank deposits remained in reserve at the Fed as shown in Figure 2-8. As these reserves emerged from the large-scale Fed purchases of Treasury securities and GSE-issued MBS, the Fed became responsible for allocating a more sizeable portion of private savings (as measured by deposits banks accepted from their customers). Private banks have an incentive to allocate savings to their most productive uses. The shift in responsibility for this allocation toward the less

efficient Government sector may have led to reduced economic potential[117] as well as financial imbalances (i.e. asset price bubbles).[118]

Figure 2-8

Workforce Participation Adversely Affecting Employment

CBO's January 2007 projection of potential real GDP for 2007-2017 had accounted for the aging of the population. CBO reported that the average growth rate of the potential labor force would slow from its 2002-2006 average of 1.1 percent growth per year to 0.8 percent for 2007-2012 and 0.5 percent for 2013-2017.[119] Thus, an aging population does not explain CBO's continual downward adjustment of potential GDP since that was foreseeable in 2007.

Figure 2-9 illustrates that the decline in labor force participation rates was substantially more than what the Bureau of Labor Statistics (BLS) had anticipated.[120] Furthermore, a notable decline occurred among the prime working-age population (those ages 25 to 54).

Figure 2-9

Labor Force Participation Rates (LFPR) Languish

Projections are from Toossi, Mitra (2007) "Labor force projections to 2016: More workers in their golden years." Monthly Labor Review, BLS. JEC interpolated these trends forward through February 2018. Shaded areas are recessions. Sources: BLS/Haver Analytics

Figure 2-10

Prime Age Labor Force Participation Among G7

Difference is from 2016 prime-age labor force participation rate and the average rate for 2003-07. Sources: OECD/Haver Analytics

Additionally, the United States was alone in experiencing a decline in prime-age labor force participation rates among the G7 member nations, as Figure 2-10 shows.

Capital Investment Stagnation and the Decline of the Natural Rate of Interest

Capital intensity, also known as "capital deepening," measures the quantity of tools, equipment, and machinery available per hour of labor worked. As of 2016, it was over 15 percent lower than what CBO had projected in 2007 (Figure 2-11). It also indicates that workers have slightly less capital at their disposal in 2017 than they did in 2009. Capital deepening has been the worst in the series' history, which extends back to 1948.

Figure 2-11

Source: BLS/Haver Analytics, *JEC used CBO (2007)'s expected 3.0% nonfarm business sector capital services growth net of potential hours worked to derive the expected 2008-17 trend line; base is 2007.

The reduction of capital intensity corresponds with a sharp decline in business capital investment in proportion to GDP after the 2008-2009 recession. Figure 2-12 shows private-sector fixed investment ("fixed" investment excludes changes in business inventories).

Figure 2-12

Fixed Investment-to-GDP Ratio

Pre-2010: 17.5%
1970:Q1-2009:Q4 average

Post-2009: 15.5%
2010:Q1-2017:Q4 average

Shaded areas are recessions.   Source: BEA/Haver Analytics

The reduction in business investment contributed to a reduced "demand for loanable funds" to finance capital accumulation, and a lower natural rate of interest (i.e., the rate consistent with a closed output gap, full employment, and stable prices). A frequently cited methodology for estimating the natural rate of interest by Laubach and Williams (2003)[121] shows a downward trend for some time, which has been interpreted as secular stagnation, beginning to set in well before the recession. However, a sharp break occurred during the 2008-2009 recession as Figure 2-13 illustrates, and its failure to revert to trend implies a cause other than long-developing "secular stagnation."

Figure 2-13

Natural Rate of Interest Collapses, 2008-09

Natural rate of interest, r*

Secular trend rate 1980-2007

Source: Natural rate of interest, Laubach and Williams (2003) methodology, retrieved using Haver Analytics. Note: Shaded areas represent recessions. 2007 average is used as base for trend.

Meager Productivity Growth

Between 1994-2004 labor productivity growth averaged 2.6 percent per year. From 2005-2008 its average fell to 1.3 percent and remained low. The slowdown in labor productivity since 2004 might suggest that a "new normal" had begun years before the 2008-2009 recession (Figure 2-14).

Figure 2-14

However, research by Guvenen et al (2017)[122] finds profit shifting by firms—a consequence of the U.S. business tax system becoming increasingly less competitive internationally as discussed in Chapter 3—caused measurement issues for labor productivity growth. Adjusting for the mismeasurement, they find that labor productivity growth averaged 2.7, 1.6, and 1.3 percent in the 1994-2004, 2005-2008, and 2009-2017 periods, compared with unadjusted values of 2.6, 1.3, and 1.3 percent, respectively (top three rows of Table 2-1).

Accounting for the mismeasurement reveals a break in the average between the 2005-2008 and 2009-2017 periods. Furthermore, when the volatile values during the recession from 2008 to 2010 are excluded, an even sharper break in labor productivity growth appears, namely from an unadjusted 0.8 between 2005-2008 and 2009-2017 to an adjusted 1.1 percentage point decline (bottom three rows of Table 2-1). Such an abrupt break suggests policy

choices after the 2008-2009 recession kept the U.S. economy from recovering its full potential.

Table 2-1

	A	B	C	D	E
1	Period	1994-2004	2005-2008	2009-2017	Break between C and D
2	As Reported	2.6%	1.3%	1.3%	-0.1%
3	**Adjusted**	2.7%	1.6%	1.3%	-0.3%
4	Period	1994-2004 (ex. 2001, 2002)	2005-2008 (ex. 2008)	2009-2017 (ex. 2009, 2010)	Break between C and D
5	As Reported	2.5%	1.5%	0.7%	-0.8%
6	**Adjusted**	2.6%	1.8%	0.7%	-1.1%

Figures may not sum due to rounding.

Figure 2-15

Figure 2-15 illustrates that that an abrupt break occurred in labor productivity growth after the 2008-2009 recession, leading to a nearly 15 percent shortfall below the 2007 CBO projections for 2017. As in the case of the aforementioned break in the natural rate of interest, the break in the productivity trend was not reversed.

Significance of Supply-Side Constraints

A low headline unemployment rate and closed output gap based on CBO's most recent estimate of potential GDP tell us little about the effects on economic performance of tax and regulatory reform. Subpar performance of the proximate determinants of economic growth—employment, capital, and productivity growth— suggests that the economy has substantial untapped potential. Given better policies, accelerating economic growth in the near term and a higher long-term growth rate seem entirely possible.

THE ECONOMIC OUTLOOK

Forward-Looking Indicators Improve

The economic outlook improved immediately after the last election as shown by the forward-looking indicators in Figure 2-16, which were little changed over the 12 months before the election.[123] Over the 12 months that followed the election, the stock market's value increased nearly 30 percent, consumer sentiment by 25 percent, and small business sentiment by 10 percent.

Figure 2-16

Change in Forward-Looking Indicators
Cumulative Percentage Changes

Data is indexed to a value of zero for October 2016 as the reported November 2016 data were collected after the election results were known. Data used: "Consumer confidence" is an index produced by the Conference Board based on consumer survey data. "Small business optimism" comes from the National Federation of Independent Business (NFIB) survey data. "Stock market" is the Dow Jones Industrial Average. Data were retrieved using Haver Analytics.

The marked upswing of forward-looking indicators reflects the expectation that removing growth-constraining policies can help recover the U.S. economy's lost potential.

Real Economic Indicators Improve

There was notable improvement in real GDP growth in 2017 compared to 2016, as growth in each quarter exceeded its corresponding quarter from the previous year (Figure 2-17). An important contributor to the acceleration in real GDP growth was private-sector non-residential fixed investment, which measures business spending on structures, equipment, and intellectual property (software, research and development, and entertainment, literary and artistic originals) (Figure 2-18).

Figure 2-17

Real GDP Growth (Annualized Rates)

- 2016
- 2017

Quarter	2016	2017
Q1	0.6	1.2
Q2	2.2	3.1
Q3	2.8	3.2
Q4	1.8	2.5

Source: BEA/Haver Analytics

Figure 2-18

Private Non-Residential Fixed Investment Contribution to RGDP Growth

- 2016
- 2017

Quarter	2016	2017
Q1	-0.52	0.86
Q2	0.41	0.82
Q3	0.42	0.58
Q4	0.02	0.82

Source: BEA/Haver Analytics

Industrial production, which is a comprehensive measure of the production of tangible goods in the United States, also expanded

robustly in 2017 (Figure 2-19). In addition, the industrial capacity utilization rate has trended upward. In December 2017, it registered 77.7 percent, the highest since March 2015, yet still below the pre-recovery average of 81.4 percent—further evidence that the U.S. economy is not operating at its full potential.

Figure 2-19

Industrial Production & Capacity Utilization

Source: Federal Reserve Board of Governors

Figure 2-20

"Real" and Headline Unemployment Rates

Source: BLS

recession

"Real" (U-6)

Jan-17, 9.4

Feb-18, 8.2

Headline (U-3)

Jan-17, 4.8

Feb-18, 4.1

The U-3 unemployment rate measures those who searched for work in the last four weeks. The U-6 unemployment rate measures the U-3 rate plus rate of those who searched for work in the past twelve months and those who want full-time work but can only find part-time work for economic reasons.

Since January 2017, the headline unemployment rate (U-3) fell 0.7 percentage point to 4.1 percent in February 2018. More notable was the faster decline in the "real" unemployment rate of 1.2 percentage points over the same period (Figure 2-20). This measure also includes those who searched for work in the past twelve months, and those among the employed who can only find part-time work for economic reasons. Its sharp decline suggests that those more adversely affected by the economy's slow growth were able to find better employment opportunities given an improved economic environment.

Figure 2-21

Hourly, Weekly Wage Growth and Hours Worked
Production and Nonsupervisory Workers

Despite notable improvements and a low headline unemployment rate, labor market slack remains. Private-sector job creation, averaging 180,000 per month in 2017, continues to exceed what is necessary to accommodate the population's growth rate. Annual hourly wage growth for production and nonsupervisory workers is only averaging 2.2 percent in the current expansion, compared with 3 percent in previous expansions (Figure 2-21). Furthermore, although the employment-to-population ratio, overall labor force participation rate, and the prime-age labor force participation rate have trended upward, they remain considerably lower than their pre-recession rates (Figure 2-22).

Figure 2-22

Employment-to-Population and Participation Rates

The Outlook under Ideal Conditions

The level of real GDP, which would be realized from the Trump Administration's forecast of 3.0 percent average growth over 2018-2028, matches what the previous Administration's OMB had projected as recently as 2013. Moreover, it is very close to CBO's 2012 estimate of potential real GDP for 2028 (Figure 2-23).

Figure 2-23

Comparative Real GDP Forecasts

Tax and regulatory reforms are intended to help unleash the U.S. economy's full potential. Figure 2-24 uses CBO's 2012 estimates for potential GDP to illustrate that an output gap would open, allowing economic growth to accelerate as policy constraints on capital and employment are lifted.

Figure 2-24

It is difficult to ascertain the U.S. economy's true potential after it was constrained for so long, Table 2-2 illustrates average annual real GDP growth rates that would be necessary to catchup to the different CBO projections for potential real GDP by a given year.[124] For example, column D, row 8 indicates the economy would need to grow at an average rate of 3.4 percent per year to catch up to CBO's 2012 projection for potential real GDP by 2025.

Table 2-2

	Column	A	B	C	D	E	F	G	H	I
					CBO's potential GDP estimates, by year of publication					
Row	Year	2009	2010	2011	2012	2013	2014	2015	2016	2017
1	2018	13.0%	12.2%	11.5%	10.1%	8.8%	6.5%	4.9%	2.8%	1.9%
2	2019	7.5%	7.1%	6.8%	6.3%	5.5%	4.4%	3.6%	2.4%	1.8%
3	2020	5.7%	5.5%	5.3%	5.0%	4.4%	3.7%	3.1%	2.3%	1.8%
4	2021	4.8%	4.7%	4.6%	4.4%	3.9%	3.3%	2.9%	2.2%	1.8%
5	2022	4.3%	4.2%	4.1%	4.0%	3.5%	3.1%	2.7%	2.2%	1.8%
6	2023	3.9%	3.8%	3.8%	3.7%	3.3%	2.9%	2.6%	2.2%	1.8%
7	2024	3.7%	3.6%	3.6%	3.5%	3.1%	2.8%	2.6%	2.2%	1.8%
8	2025	3.5%	3.4%	3.4%	3.4%	3.0%	2.7%	2.5%	2.1%	1.9%
9	2026	3.3%	3.3%	3.3%	3.3%	2.9%	2.6%	2.5%	2.1%	1.9%
10	2027	3.2%	3.2%	3.2%	3.2%	2.9%	2.5%	2.4%	2.1%	1.9%
11	2028	3.1%	3.1%	3.1%	3.1%	2.8%	2.5%	2.4%	2.1%	1.9%

The economy's potential is partly determined by factors over which the government has little influence such as population growth and age composition. The *Report* recognizes the effect of an aging population,[125] for example, which is among the long-term factors that supporters of the previous Administration often cite as a reason for the slow recovery. As the economy returns to a higher output level, economic growth will moderate, but if policymakers continue to pursue productivity-enhancing policies with regard to taxes, regulation, education, infrastructure, trade, and health outlined in the successive chapters of this *Response*, the longer-run average annual growth can be better than CBO's most recent projection of 1.9 percent.

Potential Risks to the Outlook

MONETARY POLICY RISKS. Tax reform, such as TCJA, and an improved economic outlook, raise the value of capital and workers, which in the longer run, will lead to increases in capital and employment that then lead to increased production, which puts downward pressure on inflation rates.[126] To finance additional capital investments business must seek more credit. This puts

upward pressure on interest rates, which may incidentally affect the demand side of the economy.

In particular, higher market interest rates—relative to the Fed's IOER rate (or a given expected path for the Fed's IOER rate)—encourage banks to increase lending using their abundant supply of excess reserves; this also encourages the non-banking public to spend cash balances at a faster rate. Thus, price inflation can accelerate somewhat in the near term before capital and employment attain their new, higher steady states and increased production then puts downward pressure on inflation. The risk is that the Fed misinterprets a transitory acceleration in inflation rates as the economy "overheating" and tightens monetary policy too quickly.

Figure 2-25

For example, on February 2, BLS reported an acceleration in wage growth, which could portend inflationary pressures.[127] Market turbulence in February followed, which does not appear to have arisen because the economy was "overheating" but out of fear the

Fed might think so and tighten monetary policy too quickly. As evidence, in the wake of the aforementioned BLS report, the TIPS spread, which is a market-based measure of the average expected inflation rate over the next ten years, fell and the U.S. dollar appreciated (Figure 2-26). (The "TIPS spread" is the difference in yields between 10-year Treasury Notes and 10-year Treasury Inflation Protected Securities; TIPS compensate holders for inflation.) Both a lower TIPS spread and appreciating dollar signal tighter monetary conditions ahead rather than an overheating economy.

The risk that the Fed will tighten too much should be low as forward-looking market-based measures of inflation expectations do not indicate inflation will rise to the Fed's two percent target in the next 10 years. Furthermore, the Fed's representation of the two percent inflation target as "symmetric"—an average rather than a ceiling—should afford it room to avoid tightening monetary policy prematurely. Inflation has consistently undershot the Fed's two percent symmetric inflation target since its inception in 2012 (Figure 2-26), meaning that inflation somewhat above two percent could be tolerated for a time.

Figure 2-26

Inflation Measures

ASSET PRICE BUBBLE RISKS. Prominent economists, including Martin Feldstein,[128] have expressed concern that near-zero interest rates have inflated some asset prices, and they warn that the longer the Fed waits to normalize interest rates, the greater the risk of a price collapse. Indeed, many corporations that can issue bonds at low interest rates or obtain bank credit at low rates have taken on debt to buy back their own stock.

To the extent current assets are overpriced, pro-growth policies can help. The fundamental value of a firm is the present value of its expected future cash flows. As tax and regulatory relief improve future earnings potential, the expected return on new and existing projects rises and the present value of an enterprise increases. Given a currently underutilized workforce, accelerated economic growth to underpin or raise asset valuations seems possible. The sustained rise in stock indices since the last election suggests improving investor confidence.

INTERNATIONAL FINANCIAL RISKS. The Committee Majority is concerned about financial vulnerabilities abroad, as is the CEA.[129] In particular, a foreign financial crisis can increase the demand for safe assets, which includes the U.S. dollar. Monetary economist Lars Christensen lays out the type of scenario that occurred in 2011 during the Fed's second QE program:

> *...[I]imagine that a sovereign default in a euro zone country shocks investors, who run for cover and starts buying 'safe assets'. Among other things that would be the U.S. dollar. [If the Fed takes no reaction to the increased demand for dollars] the Fed is effective allowing external financial shocks to become a tightening of U.S. monetary conditions [which reduces U.S. aggregate demand]. The consequence every time that this is happening is not only a negative shock to U.S. economic activity, but also increased financial distress.*[130]

In addition to the factors outlined in the section discussing demand-side constraints above, this may have further dampened the effectiveness of QE. As Hetzel (2012) noted:

> *...QE2 had produced an increase in Fed securities holdings of $416 billion. However, European banks increased their holdings of dollar excess reserves by more than that amount. They had good reason to accumulate excess reserves in 2011. First, the possibility was real that the troubled peripheral countries in Europe like Greece would at least partially default on their external debt and impose losses on the European banks holding that debt. Second, the European Banking Authority was under pressure to make national regulatory*

> *authorities subject to their banks to rigorous 'stress tests.'[131]*

INTERNATIONAL TRADE ISSUES. Presently, the Trump Administration is renegotiating the terms of the North American Free Trade Agreement (NAFTA), and attempting to change the international terms of trade. Retaliatory trade barriers could disrupt global supply chains, leading to a downturn in economic activity. The stock market declined on the early March 2018 news that the Trump Administration would impose tariffs on imported steel and aluminum.

FEDERAL DEBT. Static scoring of TCJA—which does not allow for GDP to rise as a result of tax cuts and therefore ignoring federal revenue gains from GDP growth—suggests the debt-to-GDP ratio will increase to 97.5 percent from a baseline of 91.2 percent in 2027.[132] But TCJA makes the tax code more efficient and will enhance the economy's ability to grow. Figure 2-27 shows how the debt-to-GDP ratio might change under different real GDP growth rates. If the U.S. economy grows faster than CBO's most recent projected baseline of 1.9 percent, the debt-to-GDP ratio will decline. If it grows at a still-modest 2.6 percent, the debt-to-GDP ratio will remain unchanged without even including the additional tax revenue gained from faster GDP growth.

Figure 2-27

GDP Growth and Debt-to-GDP Ratio Scenarios
Conservative estimate as it does not include debt-reducing dynamic revenue gains

Debt-to-GDP ratios are debt held by the public ($27,291 billion for FY2027) from CBO (2018)'s static scoring of TCJA as a percent of various FY2027 nominal GDP (NGDP) levels. The latter are calculated by compounding CBO (2017)'s baseline FY2017 NGDP ($19,120 billion) at varied average annual growth rates. Corresponding real GDP growth rates are various NGDP growth rates less CBO (2017)'s assumed average GDP price index growth of 2%.
Sources: **CBO (2017)**, "*An Update to the Budget and Economic Outlook: 2017 to 2027*," June 29, 2017; **CBO (2018)**, "*Estimated Deficits and Debt Under the Conference Agreement of H.R. 1*," December 15, 2017; JEC calculations.

In addition to tax reform, the Administration is implementing other pro-growth reforms—such as reducing regulatory burdens—which OMB projects will result in 3.0 percent average annual GDP growth over the next 10 years. With 3 percent annual growth, the debt-to-GDP ratio would fall to 87.7 percent (again, not including additional Federal tax revenue from faster growth).

The risk to the economy does not derive from passage of the tax legislation as some critics claim. On the contrary, TCJA mitigates the risk with its pro-growth effects. CBO's March 2017 *Long-Term Budget Outlook*[133], which is based on the laws in effect at the time, projected that the Federal debt is on an unsustainable trajectory, wherein the debt-to-GDP ratio rises indefinitely. Tax, regulatory, and other reforms that improve the economy's productive potential will improve, not worsen the situation, but ultimately entitlement reform is necessary to reverse the unsustainable trajectory.

CONCLUSIONS

There is an alternative explanation for the slow recovery following the 2008-2009 recession, which differs from the common view that a financial crisis and adverse long-term trends—an aging population, low labor force participation, and low productivity growth—are to blame and that the Obama Administration and the Federal Reserve did all they could to lift the economy; the former with an enormous debt-financed fiscal stimulus package, and the latter with ultra-low interest rates and quantitative easing.

The alternative explanation is that the previous Administration's spending, tax, and regulatory policies progressively constrained the economy's productive potential, while the Fed held back bank lending by paying interest on excess reserves, directing capital to inefficient uses through quantitative easing.[134]

This chapter explores the economy's performance from the 2008-2009 recession to the present, in the context of both supply and demand. The Committee Majority concurs with the *Report's* findings that supply-side determinants of real economic growth—labor, capital, and productivity—were artificially constrained by government policies that hindered Americans from realizing their full potential. Thus, the Committee Majority endorses policies that will unleash the U.S. economy's full potential. Subsequent chapters in the *Response* offer further recommendations to this end.

This chapter also offers an alternative view of factors that constrained the demand side of the economy (i.e., the Federal Reserve's payment of interest on excess reserves at rates competitive with market rates), and its credit policies, which include quantitative easing. This alternative view helps to explain the "puzzle" of persistent below-target inflation. It suggests that

monetary policy was not as "easy" during the 2008-2009 recession and its aftermath as commonly perceived.

Payment of IOER and the slow unwinding of quantitative easing programs raise complications for the demand side of the economy, especially as the Fed remains "puzzled" by low inflation and still does not appear to connect it to the IOER rate. There is some risk that the Fed—out of fear the economy may be "overheating" and inflation may suddenly accelerate—could tighten monetary policy at too fast a pace.

As time passes, it is important that the study of economic policies during and after the 2008 recession continue. The common narrative of events deserves greater scrutiny, and it should not simply become the "received wisdom" that automatically and unquestioningly informs future policy.

Recommendations

➢ The closing of the output gap from the 2008-2009 recession, relative to estimates of potential GDP under the constraints of past policies, should not be considered a truly complete recovery. With the continuation of better policies, the economy has room to grow faster.

➢ Unconventional monetary policy has not been fully unwound, and it bears continued scrutiny. It is important to establish clear goals with respect to the future use of interest on excess reserves and the size of the Fed's balance sheet.

➢ While America's tax regime after TCJA is now more internationally competitive, reform of the country's regulatory regime, health care system, education system, infrastructure, and cybersecurity must remain top priorities. Positioning these systems so the economy can

grow faster again will help with many of the country's derivative social problems.

APPENDIX 2-1: PRE-2008 IMPETUS FOR IOER

A provision of the *Financial Regulation Relief Act of 2006* authorized the Federal Reserve to begin paying banks interest on their required reserves (IORR) and excess reserves (IOER) in 2011.[135] (Because IORR does not have as significant ramifications as IOER, this chapter focuses on the latter.) The impetus was largely technical; it would enable the Fed to modernize its antiquated required-reserve regime and reduce the magnitude of Fed interventions through open market operations (buying and selling of short-term Treasury securities to alter the supply of bank reserves) that were needed to achieve its target for the fed funds rate.

The IOER rate would create a floor for the fed funds rate,[136] as it would motivate banks to hold excess reserves, rather than lend them to other banks at a lower fed funds rate, thus helping to limit the amount of reserves the Fed has to drain through open market operations to lift the fed funds rate toward its target. The Fed's discount rate—the rate at which banks can borrow reserves directly from the Fed rather than borrow the excess reserves of other banks at the fed funds rate—would serve as a ceiling.[137]

Within this "corridor" of administratively determined rates, market forces as well as the typical (but reduced) Fed open market operations would determine the fed funds rate. By raising or lowering the fed funds rate in this "corridor system" relative to the natural rate of interest—the market rate of interest consistent with price stability and full-employment, the Fed could ease or tighten monetary policy in a way that is consistent with its more reliable and effective pre-2008 operating procedures.

CHAPTER 3: THE BENEFITS OF TAX REFORM

- Chapter 1 of the *Report* discusses economic distortions that were present in elements of the previous tax system and the economic benefits of certain provisions in the *Tax Cuts and Jobs Act* (TCJA).

- CEA estimates that TCJA's corporate tax rate reduction and business expensing alone will significantly lower the cost of capital, resulting in a two to four percent increase in economic output and an average annual increase in household incomes of $4,000 or more in the long run.

- CEA also projects that reforms on the individual side of the tax code will boost GDP by up to 1.6 percent by 2020.

- This chapter of the JEC's *Response* discusses why the United States needed the reforms in TCJA to help unleash our economic potential and boost competitiveness, as well as how the changes will benefit American households and businesses.

- The JEC Majority also recommends additional reforms to build on the progress achieved by TCJA.

SUBSTANTIAL PROGRESS SINCE THE JEC'S 2017 *RESPONSE*

Last year's *Response* to the Obama Administration's final *Report* decried the lack of focus and progress on comprehensive tax reform—despite mounting evidence that our overly complex and outdated tax code was not only a disservice to individual taxpayers but hindered economic growth and undermined America's global competitiveness.[138]

A year ago, America's corporate tax rate was the highest in the developed world. Additionally, the United States was one of only a handful of developed economies with an uncompetitive worldwide system of taxation that subjected companies to both a host country and home country tax when overseas profits of domestic companies were repatriated. Also last year, pass-through businesses—many of which are small—were subject to a high top individual tax rate that had increased dramatically under the Obama Administration. Further, tax complexity was burdening individuals, families, entrepreneurs and small businesses, and the economy as a whole.

As mentioned in Chapter 1, in October 2017 the Committee held a hearing to explore declining rates of entrepreneurship and whether tax reform might help reverse this alarming trend.[139] Startup businesses less than a year old are both responsible for spurring innovation in the economy, and are the source of nearly all net new job creation, adding urgency to the problem.[140] Witnesses cited high individual and corporate tax rates, complexity in the tax code, an uncompetitive worldwide system of taxation, and the fact that companies cannot fully expense business investments among the barriers to entrepreneurship. They urged Congress to focus tax reform on boosting economic growth because a growing economy and entrepreneurship become self-reinforcing; when employment opportunities are plentiful, more potential entrepreneurs are willing to take the risk of starting a business, which in turn creates more jobs.

Since that hearing, Congress and the Trump Administration have transformed the U.S. tax code with the passage of Public Law 115-93, known as the *Tax Cuts and Jobs Act* (TCJA). Notably, TCJA either adopted or made substantial progress toward many of the recommendations of the JEC Majority in the 2017 *Response*, which were also echoed by JEC hearing witnesses. Those

recommendations included lowering both individual and corporate tax rates, moving to a competitive territorial tax system, allowing expensing of business investments, and simplifying the tax code.

TAX REFORM: A NECESSITY FOR BOOSTING AMERICA'S ECONOMIC POTENTIAL

To operate at full potential, an economy needs its working-age population in the workforce (labor supply); businesses willing and able to hire and equip workers with high-quality facilities, equipment and know-how (capital investment); and technological innovation that empowers workers to produce more per hour (productivity). Tax policy can affect each of these factors either positively or negatively.

The Joint Committee on Taxation (JCT) has explained several of these economic effects. For example, lowering the tax rate paid by individuals allows them to keep more of the money they earn, thus increasing their incentive to work. Similarly, lowering tax rates paid by businesses decreases the cost of capital, which encourages more investment in their business and workers by purchasing equipment or providing skills training, both of which make employees more productive.[141] Higher productivity generally leads to higher wages for workers.[142] Higher wages, in turn, may entice more potential workers into the workforce, creating greater prosperity, opportunity, and growth.

Conversely, tax policy can also hinder economic growth. High marginal tax rates on individuals discourage them from working and increasing their earnings. High tax rates on businesses can drain resources that could otherwise be invested in their business and workers. Additionally, slow cost recovery for equipment purchases that require businesses to depreciate assets over many

years discourages companies from making the kind of investments that raise productivity and wages.

In addition, tax policy can have a direct impact on the location of investments. If the domestic tax climate makes it less profitable to invest in the United States, businesses have a powerful incentive to invest in and possibly even relocate to other countries with more favorable tax systems. This diverts both capital and workforce opportunities from the United States, further lowering our Nation's growth potential. A tax code that makes America the best place in the world to work, invest, and start a business is a key ingredient for strong economic growth.

Additionally, the time and resources spent by both individual taxpayers and businesses complying with tax rules is a drain on the economy. The Tax Foundation estimated that Americans spent 8.9 billion hours filling out tax forms in 2016 alone, costing the economy $409 billion in lost productivity.[143]

As discussed earlier in this *Response*, the economy under the Obama Administration experienced subdued levels of workforce participation by people in their prime working years, depressed levels of business investment, and relatedly, low levels of productivity and wage growth. Yet, instead of pursuing pro-growth tax policy, the previous Administration imposed over $1 trillion in new taxes through the *Affordable Care Act* (ACA), many of which affected low- and middle-income taxpayers; increased taxes on pass-through businesses by raising the top individual tax rate; increased the cost of capital by raising capital gains taxes; and let the United States fall ever further behind our international competitors by leaving in place a high corporate tax rate and worldwide tax system.[144]

FEATURES OF THE *TAX CUTS AND JOBS ACT*

TCJA is a dramatic departure from the anti-growth tax policies of the previous Administration. It lowers taxes on labor and capital, incentivizes business investments that boost productivity and wages, increases America's global competitiveness, and makes taxes easier and more comprehensible for millions of taxpayers.

TCJA Provisions Affecting Individuals and Families

TCJA lowered individual tax rates (Figure 3-1) and applied the lower rates to broader swaths of income beginning in 2018. Additionally, taxpayers in the 10 percent bracket will have an effective tax rate of zero percent under TCJA due to the increased standard deduction described later.

Figure 3-1

Individual Marginal Tax Rates

Before TCJA	After TCJA
10%	10/0%
15%	12%
25%	22%
28%	24%
33%	32%
35%	35%
39%	37%

Figure 3-2 shows the tax rate reductions for low- and middle-income taxpayers who are married and file joint tax returns. The Joint Committee on Taxation estimated that in 2019 TCJA will result in an average tax cut of eight percent, with the largest percentage reductions experienced by taxpayers with incomes

between \$20,000 and \$50,000.[145] These lower rates boost take-home pay of workers, which not only improves their standard of living but increases the incentive to work and earn more. Workers began seeing fewer taxes withheld from their paychecks in February 2018.[146]

Figure 3-2

TCJA also provided taxpayers with additional tax relief and greater simplicity through a larger standard deduction. Taxpayers have the option of taking a simple standard deduction or itemizing a series of more complex deductions. By nearly doubling the standard deduction, TCJA effectively offers a zero tax rate bracket for a larger share of taxpayers' income. As a result, an estimated nine out of 10 tax filers will choose this simpler option.[147] Even those who itemize deductions will see a more streamlined form that will not require them to track as many expenses and receipts. Itemizers will still be able to deduct interest on mortgages of up to \$750,000, up to \$10,000 in State and local taxes, and even more of their donations to charity through a higher annual limit on the

charitable deduction. Additionally, for 2017 and 2018 itemizers with catastrophic health care costs will have relief from an ACA tax hike, described later, affecting the medical expense deduction.

Figure 3-3

Standard Deduction

Single — 2017: $6,350 — 2018: $12,000
Head of Household — 2017: $9,350 — 2018: $18,000
Married Filing Jointly — 2017: $12,700 — 2018: $24,000

Source: TCJA Conference Agreement

Tax reform also provided significant tax relief for families with children and other dependents. TCJA doubled the child tax credit from $1,000 to $2,000 per child and allowed up to $1,400 of each credit to be refundable, meaning that those without tax liability can still claim the credit. (The refundable portion will grow with inflation up to the full $2,000 value of the underlying credit.) TCJA also includes a nonrefundable $500 tax credit for dependents who do not qualify for the child credit. Additionally, TCJA maintained the adoption tax credit and the credit for child and dependent care expenses. The combination of lower tax rates, a larger standard deduction, and expanded tax credits for children produces substantial tax relief for a family of four, as illustrated by the following chart. Of note, the chart does not include the effects of the Earned Income Tax Credit, which was maintained in

TCJA and provides an additional refundable credit to working taxpayers with low income.

Figure 3-4

Tax Cut for Married Couples with 2 Kids
Based on Adjusted Gross Income & Standard Deduction; Includes Child Credits; Does Not Include EITC

Source: JEC staff calculations of the *Tax Cuts & Jobs Act* (P.L. 115-97) based on Conference Report to Accompany H.R.1 (Report 115-466).

In its macroeconomic analysis of TCJA, JCT described how these tax provisions combine to encourage potential workers on the sidelines to join the workforce:

> *The significant reduction in marginal tax rates on labor (resulting primarily from the additional tax rate bracket, lower statutory rates for most brackets, and the increase in the child credit) provide strong incentives for an increase in labor supply.*[148]

A previous study found small overall effects on labor supply from high individual tax rates but significant effects on the willingness of married women to work. The same study found that high rates create other economic distortions, including causing people to engage in or refrain from certain activities to

avoid taxes, which is particularly prevalent among higher-income taxpayers.[149] These tax avoidance techniques are part of the excess burden of taxation that will be discussed later in this chapter.

Harvard economist Robert Barro projects a strong short-run response from TCJA's individual tax rate reductions that will boost GDP by a total of 1.6 percent through 2019.[150] While Barro expects the growth to level off beyond 2019, the higher level of GDP that results from the market efficiency of lower rates will endure. CEA came to a similar conclusion, projecting GDP to increase by up to 1.6 percent by 2020.[151]

CEA also noted research indicating that older workers are more responsive to changes in marginal tax rates than younger ones.[152] This suggests that the tax rate reductions may encourage more of those nearing retirement age to stay in the workforce.

Due to a lack of support from the Minority party in Congress, TCJA could only be enacted under complex budget reconciliation procedures, which allow for passage in the Senate with a simple majority vote. Unfortunately, the strict rules for this process led to the expiration of TCJA provisions affecting individuals after 2025. The JEC Majority fully supports making these provisions permanent. Essentially, JCT provided an economic argument for doing so by explaining that without such an action, some of the employment gains from TCJA could otherwise be erased after 2025:

> *After the sunset of the individual tax provisions, the increase in employment is expected to decline.*[153]

Tax Fairness

The term "fair" is highly subjective, including in the context of taxation. For example, a flat tax on all types of income might be

considered a fair way to raise revenue because it would treat all taxpayers equally, imposing the same tax rate on all taxpayers and all types of activity. Others may view fair taxation as imposing more than proportional taxes on higher-income taxpayers. In this vein, the Federal tax code is "progressive" with higher marginal income tax rates applied to incremental income. Notably, several elements of TCJA address both notions of fairness.

TCJA is evenhanded by lowering taxes for all income groups, but TCJA also increases the progressiveness of the tax code. During the time that TCJA provisions affecting individuals are in effect, the new and lower overall tax burden will be borne more heavily by taxpayers with incomes greater than $1 million. For example, JCT estimated that by 2019, taxpayers with incomes over $1 million will pay 19.8 percent of all Federal taxes, compared to 19.3 percent without TCJA. Conversely, under TCJA, taxpayers with less than $50,000 in income will see their share of Federal taxes in 2019 decline from 4.4 percent to 4.1 percent.[154]

If a future Congress decided not to renew or make permanent the individual tax provisions, JCT indicated that this increased progressiveness of the tax code under TCJA would disappear, providing yet another argument for extending them beyond 2025.

Further, TCJA reduces tax benefits that mainly benefit higher-income taxpayers and reduces or eliminates taxes that disproportionately burden low- and middle-income Americans. One such tax is the individual mandate penalty.

Before TCJA, Americans without health insurance not only dealt with the vulnerability of being uninsured but also faced a tax penalty under the ACA's individual mandate, which requires Americans to maintain Government-approved health insurance. TCJA reduced the individual mandate tax to zero; consequently, Americans will no longer be taxed simply for being uninsured.

This penalty was a very regressive tax. For example, during the 2015 tax filing season, nearly 85 percent of those forced to pay it had incomes less than $50,000.[155]

Figure 3-5

Low- and Middle-Income Americans Disproportionately Paid the Individual Mandate Tax		
Adjusted Gross Income	Number of Returns	Percent of Total
$0	26,021	0.3%
$1- $5,000	63,082	0.8%
$5,000 - $10,000	156,588	1.9%
$10,000 - $15,000	967,939	12.0%
$15,000 - $20,000	1,307,589	16.2%
$20,000 - $25,000	1,236,222	15.3%
$25,000 - $30,000	963,174	11.9%
$30,000 - $35,000	747,937	9.3%
$35,000 - $40,000	561,121	7.0%
$40,000 - $45,000	434,909	5.4%
$45,000 - $50,000	347,501	4.3%
Over $50,000	1,249,521	15.5%
Returns under $50,000	**6,812,083**	**84.5%**
$50,000 and over	**1,249,521**	**15.5%**
Total Returns	**8,061,604**	---
Source: IRS SOI Data, 2015 tax filing season		

TCJA provides temporary relief from another ACA tax increase that disproportionately affects low- and middle-income taxpayers. Before the ACA, Americans who itemize deductions could deduct out-of-pocket medical expenses that exceeded 7.5 percent of their adjusted gross income. The design of this deduction ensures that only taxpayers with very high medical costs relative to their income can obtain tax relief. The ACA made it more difficult to afford catastrophic costs by raising the income threshold to 10 percent. (Seniors received a temporary exception that expired last year.) According to the Internal Revenue Service (IRS), 83 percent of taxpayers who used this deduction in 2016 had incomes less than $100,000.[156] TCJA reinstates the 7.5 percent threshold that existed before ACA for the 2017 and 2018 tax years.

In addition, TCJA limited an itemized deduction that mainly benefits those with high incomes. TCJA placed a cap of $10,000 on the deduction for State and local taxes (SALT). As the table below illustrates, this is only slightly less than the average SALT deduction claimed in 2016. Further, the cap is larger than the average deduction taken by taxpayers with incomes lower than $200,000. CEA also noted that the benefits of an unlimited SALT deduction skew heavily to high-income taxpayers.[157]

Figure 3-6

Cap on SALT Deduction Mostly Affects Higher-Income Taxpayers

Adjusted gross income	Number of tax returns	Average deduction	
All returns, total	33,063,383	$10,667.43	
Under $5,000	74,184	$4,510.51	
$5,000 under $10,000	98,328	$2,591.46	
$10,000 under $15,000	192,403	$2,519.23	
$15,000 under $20,000	313,094	$2,065.58	
$20,000 under $25,000	406,796	$2,119.97	
$25,000 under $30,000	557,060	$2,094.96	
$30,000 under $35,000	693,840	$2,081.61	Under
$35,000 under $40,000	899,962	$2,168.78	$10,000
$40,000 under $45,000	955,900	$2,590.11	cap
$45,000 under $50,000	1,049,616	$2,642.42	
$50,000 under $55,000	1,103,076	$2,921.36	
$55,000 under $60,000	1,126,872	$3,167.25	
$60,000 under $75,000	3,290,380	$3,658.96	
$75,000 under $100,000	5,511,568	$4,663.31	
$100,000 under $200,000	11,533,393	$7,644.68	
$200,000 under $500,000	4,212,361	$17,922.31	
$500,000 under $1,000,000	696,445	$48,098.67	
$1,000,000 under $1,500,000	152,902	$94,844.02	Above
$1,500,000 under $2,000,000	62,412	$140,361.92	$10,000
$2,000,000 under $5,000,000	93,602	$249,795.24	cap
$5,000,000 under $10,000,000	23,772	$570,221.18	
$10,000,000 or more	15,419	$2,491,170.63	

Source: IRS SOI Data, 2016 tax filing season

Additionally, even with a full deduction under previous law, only 22 percent of tax return filers claimed the SALT deduction in 2016.[158] Fewer still will take this deduction due to the much larger standard deduction in TCJA, further shrinking the universe of taxpayers who might be affected by the cap. Another benefit of the cap is that a high SALT deduction tended to make taxpayers more likely to pay the Alternative Minimum Tax (AMT), discussed later in this chapter. In summary, relatively few taxpayers will be affected by the limit on the SALT deduction, those who do are

likely to have high incomes, and even the affected taxpayers will have the side benefit of less exposure to AMT.

The cap on the SALT deduction also addresses a previous inequity in the tax code that arose from the fact that the higher a State's taxes, the less Federal income tax the IRS collected from that State. Taxpayers in States that set above-average tax rates obtain a greater tax benefit from the Federal Government than those who live in States with lower tax rates, which amounts to a cross-subsidy from low- to high-tax States.

TCJA Provisions Affecting Small Businesses and Pass-Through Companies

Approximately 95 percent of businesses pay taxes at the individual level rather than corporate level; these are known as pass-through businesses.[159] The vast majority of small businesses are organized as pass-throughs, and a high top individual tax rate can drain precious resources from the business.

When President Obama took office, the top Federal tax rate paid by pass-through businesses was identical to the top rate paid by large corporations at the time, 35 percent. However, the Obama Administration insisted on raising the top statutory individual rate to 39.6 percent. Other Obama-era tax increases—including a limit on itemized deductions and the ACA's 3.8 percent tax on investment income—pushed the top effective rate paid by small businesses to 44.6 percent.[160] When State taxes are included, many small businesses faced the prospect of more than 50 cents of every additional dollar earned being consumed by Federal taxes alone.

TCJA reversed part of the Obama tax increase on pass-through businesses by lowering the top individual rate from 39.6 percent to 37 percent. Additionally, TCJA provided a new deduction equal to 20 percent of pass-through business income. TCJA also

contains safeguards against abuse by preventing taxpayers with incomes greater than $315,000 from disguising their personal income as business income. For example, pass-through businesses with higher income will have to demonstrate that they are paying a significant amount of wages or making large capital expenditures in order to claim the deduction.

The combination of the lower statutory rate and the pass-through deduction creates a top effective rate of 29.6 percent. This new rate is much closer to the top 28 percent rate (represented by the top bar in Figure 3-7) established by the bipartisan Tax Reform Act of 1986.[161]

Figure 3-7

Additionally TCJA doubled the amount of equipment purchases that small businesses can immediately deduct from taxes—known as small business expensing—from $500,000 to $1 million.[162]

Faster Cost Recovery to Boost Investment

Generally, instead of allowing an immediate tax deduction for the full cost of purchasing an asset (expensing), the tax code requires businesses to use complicated depreciation schedules to deduct the cost gradually over many years.[163] As a result, a business that purchases new equipment but has not yet produced a profit will be treated by the tax code as if it had profit to be taxed because the equipment's cost is only partially deductible in the first year. As a result, it will take much longer for the business to break even and become profitable, potentially discouraging the company from making needed investments in the first place. As mentioned above, small businesses have traditionally been able to expense a certain amount of purchases, but the relief phases out once the company makes high levels of investment and it still requires complicated bookkeeping.[164]

Slow cost recovery discourages businesses—particularly those that depend on cash flow—from purchasing new equipment and upgrading facilities. These investments, in turn, allow workers to produce more per hour, and this higher productivity tends to increase wages.[165] Allowing businesses to write off all costs when they occur would recognize reality and encourage more growth-producing business investments.

In order to boost business investments and economic growth, Congress has passed temporary extensions of bonus depreciation, under which companies of all sizes can deduct a large portion of the purchase price in the first tax year. However, before TCJA, the extra portion of investments that could be deducted immediately was scheduled to decline from 50 percent in 2017, to 40 percent in 2018, and to 30 percent in 2019, after which it would disappear completely.

TCJA provides 100 percent bonus depreciation—which is essentially expensing—for purchases made after Sept. 27, 2017,

through the end of 2022. TCJA also allows used assets to be eligible for bonus depreciation instead of just new property.

Figure 3-8

The JEC Majority recommends that expensing be made a permanent part of the tax code in order to maximize the economic benefit. According to the Tax Foundation, expensing of all business investments would create the equivalent of over one million new full-time jobs, raise the incomes of low- and middle-income Americans by at least 4.9 percent, and boost long-run GDP by 5.4 percent.[166]

Increasing the Competitiveness of U.S. Corporations

Before TCJA, the tax code imposed substantial burdens on American corporations competing in global markets on two fronts. First, among the 34 advanced economies in the OECD, the U.S. corporate rate topped all others in 2017 at nearly 39 percent, including both the 35 percent Federal rate and average State taxes.[167] In addition, U.S. businesses were faced with an

uncompetitive worldwide tax system rather than a territorial system. Territorial systems allow active business income earned overseas to be brought back to the home country with little or no tax. In contrast, America's worldwide system subjected all income to U.S. taxation, regardless of where it was earned. The tax was triggered when profits are brought back to the United States, giving companies a strong incentive to leave earnings overseas. This created a lock-out effect, which resulted in reduced levels of investment by American companies in the United States.

The United States was essentially losing ground by standing still as other nations lowered their corporate rates and moved to territorial systems to attract businesses, investment, and jobs. The chart below shows the movement in OECD tax rates from 2000-2017.

Figure 3-9

The next chart illustrates that as the corporate tax rates declined in 10 large economies in the OECD—all of which adopted territorial tax systems—a larger share of the income of U.S. businesses was

left offshore.[168] Unsurprisingly, the dip in U.S. earnings that were left overseas in 2005 occurred due to a temporary tax holiday that allowed businesses to repatriate their profits to the United States at a much lower tax rate.[169]

Figure 3-10

Additionally, in September 2017, CBO noted that America's high corporate rate and worldwide tax system encouraged U.S. businesses to convert their tax headquarters to foreign nations—a practice known as a corporate inversion—or engage in other methods of shifting income away from the United States so that it can be taxed at the lower rates of other nations.[170] A corporate inversion can be accomplished through a U.S. company's merger with or acquisition of a foreign company, after which the foreign company's home country with a more favorable tax system becomes the place of incorporation.

CBO noted that the net tax savings of inverted companies translate into an even greater loss for the U.S. Treasury, as more tax payments go to the low-taxing foreign jurisdiction and

significantly less go to the U.S. CBO estimated that though the average tax savings of inverted companies was $47 million, payments to the U.S. were on average $65 million—or 46 percent—lower than they would have been without the inversion.[171]

At the time, CBO projected that unless America changed policy direction, inversions and other profit shifting would grow over the decade, reducing U.S. corporate tax revenue by $12 billion more in 2027 than if profit-shifting activity remained constant at 2017 levels.[172] CBO expected this growth in spite of strenuous efforts by the Obama Administration to shut down inversion transactions through regulation, further proving that treating the symptoms of an uncompetitive tax system was an ineffective and incomplete solution.

In order to prevent the loss of headquarters, jobs, and investment to nations with more attractive tax systems, TCJA lowered America's Federal corporate rate from 35 percent to 21 percent and moved to a competitive territorial system. The chart below, which incorporates both national and average sub-national taxes in OECD countries, illustrates how these two changes put America on a much more competitive footing with other developed economies.

Figure 3-11

Additionally, TCJA includes several provisions to limit the artificial shifting of U.S. profit to overseas locations. JCT analyzed the full effect of these anti-abuse provisions, the corporate rate cut, and new territorial system and concluded:

> *The provisions affecting taxation of foreign activity are expected to reduce the incentive for this "profit-shifting" activity... The macroeconomic estimate projects an increase in investment in the United States, both as a result of the proposals directly affecting taxation of foreign source income of U.S. multinational corporations, and from the reduction in the after-tax cost of capital in the United States due to more general reductions in taxes on business income.*[173]

The Relationship between Corporate Taxes and Wages

Since passage of TCJA, companies across America have announced worker bonuses, pay raises, investment in worker training, more generous benefits, greater investment in the United States, movement of overseas production to the United States, and increased contributions to charity.[174] In the *Report* CEA calculated that as of the date of publication, 4.2 million workers were enjoying higher wages, salaries, bonuses, and contributions to 401(k) retirement accounts as a direct result of TCJA. CEA also estimated the worker bonuses totaled $2.4 billion and that newly announced business investments totaled $190 billion.[175]

Despite tangible benefits to workers that are already apparent, economic debate continues over the incidence of corporate taxes, that is, which taxpayers bear the burden of the corporate tax. Prior to 2013, JCT assumed that the corporate tax was borne solely by owners of capital, generally the shareholders. However, in 2013 JCT announced that based on economic literature it would begin attributing 25 percent of the burden of corporate taxes to labor— in the form of lower compensation for U.S. workers—when analyzing the impact of various policy changes on taxpayers.[176] JCT cited a range of opinions on the matter. For example, in 2006 a working paper prepared by the Congressional Budget Office concluded that workers bear 70 percent of the burden. JCT therefore indicated it could no longer ignore the impact on workers due to the increasing weight that recent economic literature placed on labor.

The extent to which corporate taxes are borne by owners of capital or labor hinges on the mobility of capital. If capital is mobile, it will shift from high-tax to low-tax jurisdictions, leaving labor, which is less mobile, to bear the burden. Economists who assume America is a closed economy tend to claim that reducing corporate taxes will only benefit shareholders and other owners of capital,

but that is not a sound assumption in today's global economy. It is much easier to move funds to the United Kingdom, for example, than for a worker to move to the United Kingdom. JCT's acknowledgement of the open nature of the U.S. economy was part of the reason for attributing at least some of the long-run effect of corporate taxes to labor.

However, JCT also considered other economic studies positing that the U.S. economy is so large that there are limited opportunities to shift capital overseas.[177] This led the authors to conclude that owners of capital bear a much larger share of corporate taxes, which perhaps influenced JCT to allocate a relatively small share to workers.

The trend outlined in the previous section of growing U.S. earnings kept offshore, corporate inversions, and profit shifting to lower-tax jurisdictions provides ample evidence of the mobility of U.S. capital despite the large size of our economy. For this reason, the JEC Majority believes that JCT may have underestimated the impact of corporate taxes on the wages of workers. For its part, CEA noted that profit-shifting activity is highly responsive to tax rate differentials and that U.S. business profits kept offshore tend to reduce the wages of U.S. workers.[178]

CEA analyzed the impact on wages of two pro-growth elements of TCJA that reduce the cost of capital—the reduction in the Federal corporate rate from 35 percent to 21 percent and the introduction of expensing of business investments. After examining a range of economic literature and cross-country studies, CEA concluded that these two reforms alone would boost annual average household incomes by about $4,000 or more in the long run.[179]

It is also important to remember that stock ownership is not exclusive to wealthy individuals. For example, an estimated 37

percent of corporate stock is held in retirement accounts, indicating that average workers would benefit from lower corporate taxes through more income in retirement.[180] Additionally, high taxes that burden either capital or workers damage the levers of economic potential outlined at the beginning of this chapter—labor supply, capital investment, and productivity.

Tax Simplification for Individuals

As noted earlier, the cost of filling out tax forms alone costs America more than $400 billion annually in lost productivity, a figure CEA also cited in a discussion of the excess burden of taxation on the economy.[181] Compliance costs, along with the cost of tax avoidance schemes, are part of the excess burden—or deadweight loss—which occurs when it costs the economy more than one dollar to collect one dollar in taxes. TCJA contains several provisions that offer greater simplicity to both individuals and businesses, which will reduce the excess burden of taxation.

The increased standard deduction simplifies the taxes of millions of Americans who would otherwise itemize a series of deductions. TCJA also eliminated a complex limit on itemized deductions that reduced their value for some taxpayers. Additionally, the law repealed a complicated phase-out of personal exemptions, choosing instead to replace personal exemptions with a straightforward $500 tax credit for non-child dependents. TCJA eliminated other targeted provisions that added extra lines to individual tax forms in favor of broad-based tax relief for all taxpayers.

Earlier versions of TCJA also would have repealed the individual Alternative Minimum Tax. The AMT operates as a parallel tax system that requires Americans to calculate their tax burden under two separate structures. The AMT tends to ensnare taxpayers with

many children, a second mortgage, high State taxes, or who otherwise claim various tax benefits. AMT taxpayers must then recalculate their taxes under a different set of rules, usually resulting in paying much higher taxes.[182]

The AMT was originally inspired by 1969 testimony of the then-Treasury Secretary to the Joint Economic Committee that 155 affluent individuals paid no income tax.[183] Yet, instead of targeting the ultra-wealthy the AMT hit almost 4.5 million taxpayers during the 2016 tax filing season, including thousands of Americans with incomes of less than $15,000.[184] Over 10 million taxpayers in the same year had to use complicated calculations on a separate form to determine whether AMT might apply, and millions more had to do other calculations to see whether they were required to fill out that form.[185]

The final version of TCJA increased the amount of income that is exempt from the individual AMT rather than fully repealing it. While this provides additional monetary relief from the AMT, it does not lift the complexity burden for taxpayers who will still have to determine whether they owe AMT. The JEC Majority recommends that lawmakers consider fully repealing the Alternative Minimum Tax.

Tax Simplification for Businesses

Witnesses at the October 2017 JEC hearing on tax reform and entrepreneurship frequently mentioned tax complexity as a barrier for startups and other small businesses. The National Federation of Independent Business (NFIB) reports that tax compliance is 67 percent more costly for small businesses than for larger ones.[186] Large businesses enjoy economies of scale and can dedicate a team of professionals to compliance, while small startups generally need to focus precious resources on business survival and have difficulty affording professional help. Further, a study by

the U.S. Small Business Administration noted that the tax system represents 80 percent of the overall Federal paperwork burden.

The hearing testimony recommended expanding the use of cash accounting for startup businesses. The two most common types of accounting are the cash and accrual methods. The cash method is considered simpler because it generally reflects the cash flow of the business; reportable income occurs when businesses receive payment and expenses are deducted when payments are made. Under the accrual method, taxpayers must report income when it is earned and payments when they are owed, even if payments are not made or received until a different tax year. As a result, a business may be taxed on phantom income it has not received yet and may never receive. Before TCJA, companies with $5 million or less in gross receipts could generally use the cash method, but the rules could be more or less restrictive depending on the type of business structure and activity, and a company could be forced to switch to the accrual method if it no longer qualified for the cash method under the maze of rules.[187] TCJA expanded the gross receipts test to $25 million and loosened other restrictions, allowing a larger universe of small businesses to grow without fear of triggering more burdensome accounting.[188]

TCJA's expansion of small business expensing and 100 percent bonus depreciation also provide relief from complexity. Traditional depreciation rules require business owners to track when an asset was purchased, which depreciation schedule applies to particular assets, and how much has already been deducted from the purchase price over past years. The Tax Foundation estimates that replacing depreciation with expensing would reduce annual tax paperwork costs by an estimated 448 million hours and $23 billion.[189] This is in addition to the other economic benefits mentioned earlier of higher business investments, economic growth, productivity, and wages, which is why the JEC Majority

recommends that expensing be made permanent for businesses of all sizes.

Expiring provisions in the tax code also create complexity and uncertainty for business owners and make long-term planning difficult, as it is unclear which tax rules will apply in a given year. Due to budget constraints and other factors, TCJA contains several provisions that expire, including bonus depreciation, the pass-through deduction, most tax relief for individuals and families, and several other provisions affecting businesses. The JEC Majority recommends that lawmakers make sound tax policy permanent by determining which provisions should be kept and which should be allowed to expire.

The Impact of Economic Growth on Deficits

Measuring debt as a share of GDP provides a useful guide for gauging an economy's ability to pay for the debt the Federal Government owes. The debt-to-GDP ratio can be reduced either by lowering the amount of debt owed or boosting the level of output a country produces. The debt-to-GDP ratio rose dramatically during the Obama Administration, worsened because the economy was growing slowly. The JEC Majority attributes much of this slow growth to the previous Administration's policies of increasing tax and regulatory burdens and the fact that most of the tax revenue was spent on Government transfer payments instead of productivity-enhancing investments.

The top line on the chart below is CBO's most recent projection of the long-term ratio of debt to GDP.[190] The bottom line shows that CBO's debt trajectory would have been much less steep had the Obama Administration's FY2010 projections of economic growth materialized.[191] This does not even include the macroeconomic effects of higher GDP on Federal revenues, which

would have lowered the debt trajectory further. Because the promised growth dissolved into sluggish growth, subsequent Administrations and Congresses face a substantially more challenging fiscal situation.

Figure 3-12

Publicly Held Federal Debt as a Percent of GDP

Source: CBO, OMB, JEC calculations

Faster economic growth not only reduces the debt-to-GDP ratio by enlarging the economy but lowers the nominal amount of deficits and debt as well. A growing economy generates more tax revenue through a greater number of people working and higher profits. It also reduces Federal spending on safety-net programs such as unemployment insurance and welfare payments. Similarly, slow growth worsens deficits. For example, in its January 2016 budget and economic projections, CBO estimated that if real GDP growth was even 0.1 percentage point lower than projected over the decade, deficits over the same period would grow by a total of $327 billion.[192]

TCJA aimed to boost economic potential and reset the economic growth trajectory to a higher level by transforming a broken tax code into one that allows faster economic growth, which would have the added benefit of making Federal debt less challenging to manage over the long term. The need for fundamental rather than incremental reform is why Congress dedicated $1.5 trillion in net tax relief within the first 10 years for TCJA.

Some critics who seemed less concerned about increases in Federal spending and debt of a far greater magnitude under the previous Administration now cite concerns about TJCA's impact on deficits and debt. The debt-to-GDP ratio nearly doubled on the Obama Administration's watch,[193] fueled by deficit spending on transfer payments and not growth-producing investments, and its policies *slowed* the recovery far below what is normal after a severe recession. TCJA facilitates *faster* economic growth, which renders deficits less threatening and creditors less concerned. The JEC Majority continues to believe that long-term debt represents a looming problem, but the major drivers of deficits and debt continue to be ever-growing mandatory spending programs, not a lack of revenue.

In June 2017, CBO projected that Federal revenue would remain above its historical average over the next decade, while spending will accelerate at a much faster rate.[194] Mandatory spending, which accounts for roughly two-thirds of the spending line in Figure 3-13, is expected to grow in nominal terms by 70 percent over the decade, far outpacing expected growth in GDP over the same period.[195]

Figure 3-13

Projected Revenue and Spending as a Share of GDP

Source: CBO

Or from another perspective, the $1.5 trillion in net tax relief from TCJA is roughly equivalent to the amount of tax increases enacted during the Obama Administration, including over $1 trillion from the ACA and hundreds of billions more from the 2013 increase in individual and capital gains taxes due to the so-called "Fiscal Cliff" negotiations.[196] But while the Obama Administration's tax increases tended to slow economic growth, the tax relief in TCJA will accelerate economic growth.

CEA cited a study by Christina Romer, former CEA Chair in the Obama Administration, and well-known economist David Romer, which found an inverse relationship between tax increases and economic output.[197] Their research indicated that the effect of an exogenous tax increase—or in other words, an isolated change not affected by other factors that determine output—is not only large but highly statistically significant. Romer and Romer removed other factors that determine output—such as the business cycle, countercyclical Government fiscal policy and monetary policy—

and concluded that a tax increase equal to one percent of GDP lowers output up to three percent ten quarters later.[198] Thus, a tax reduction of equal magnitude to the tax increases enacted in the previous Administration was necessary to counteract residual negative effects on the economy.

Additionally, it is important to remember that TCJA was enacted under budget reconciliation procedures, which require that legislation not add to long-term deficits after the first 10 years. And even when examining the more temporary budget effect in the first 10 years, the tax reduction represents roughly three percent of Federal revenues and 0.6 percent of the GDP that CBO previously projected over the next decade, even without taking economic growth effects into account.[199] When growth effects are factored in, the temporary impact on deficits in the first decade is smaller still, even according to the relatively modest macroeconomic estimates of JCT.[200]

CEA projects a more robust effect on economic growth from TCJA than JCT. In addition to the effect on household income mentioned above, CEA estimates that lower corporate rates and expensing of business investment alone will boost GDP by two to four percent in the long run by lowering the cost of capital. If businesses expect that expensing will be made permanent, CEA projects the increase in GDP will be at the high end of that range.[201]

CONCLUSION

The *Tax Cuts and Jobs Act* will encourage potential workers to rejoin the workforce and boost capital investment and productivity. Tax reform will also help counter the policy constraints that burdened the economy under the previous Administration. All of these are necessary for restoring our

Nation's economic potential and creating greater prosperity for American households.

Recommendations

In order to build upon the progress achieved by TCJA, the JEC Majority recommends additional reforms that:

➢ Make permanent TCJA's provisions affecting individual taxpayers and pass-through businesses;

➢ Make expensing of business investments permanent;

➢ Provide additional tax simplification, including full repeal of the individual Alternative Minimum Tax; and

➢ Address the growing Federal debt through reforms to mandatory spending programs, which are the true drivers of deficits and debt.

CHAPTER 4: REGULATION

- *The Report* discusses the benefits and costs of regulation extensively, drawing particular attention to less apparent costs such as from land use restrictions, which decrease labor mobility and job creation. It cites economic literature showing large burdens on the economy from unexpected regulatory costs.

- While regulation—and its economic impact—are not easy to measure, varied approaches all show that regulation in America has substantially increased both over time and in relation to a number of other countries.

- The Trump Administration's deregulatory actions eliminate unnecessary and harmful rules, and importantly, exceed the number of new regulations, thereby expanding economic opportunities.

REGULATION THAT HELPS OR HINDERS THE ECONOMY

When examining the relative health of economies around the world, one of the most important determinants of prosperity is the freedom of markets within a nation.

Markets are the Engine of Economic Growth

Natural resources, labor, capital, and technology determine economic growth in the long run. However, certain countries rich in factors of production do not succeed economically (Venezuela), while others with few of these factors become some of the world's wealthiest economies (Singapore). Institutional frameworks set them apart—government control and discretion in the former, and

the freedom to conduct private commerce under predictable, generally unobtrusive laws in the latter.

Since the collapse of the Soviet Union, many countries have relied more upon markets. These include the social welfare states of Western Europe that already had market economies. Twenty-eight countries formed the European Union (EU) with no tariffs among them; some privatized state-owned enterprises, and many reduced business taxes and regulation. As Chapter 1 documents regarding corporate taxes and product market regulations, various EU countries continue efforts to scale back government overreach and liberalize markets to raise low economic growth. A prominent example is France since the election of President Emmanuel Macron last year.[202]

Markets Can Deal with Economic Challenges

The experience of countries that have risen from poverty by making their institutions conducive to private entrepreneurship, particularly the ones with few natural resources such as South Korea, serves as a reminder of how best to address various challenges at home. Changes in the factors of production such as an aging workforce (see Chapter 1), and social problems such as the opioid crisis (Chapter 8) can make it more difficult to continue raising the standard of living. At the same time, advancing technologies continually demand new skills and new infrastructure. These developments challenge the economy to keep resources fully employed and productive.

Allowing markets to work without unduly restraining them is most effective. One kind of regulation tends to be more helpful in that pursuit than another. Economics Nobel Prize laureate F. A. Hayek distinguished "formal" rules that facilitate the use of resources and are almost a means of production from "substantive" rules by which governments direct resources to particular uses:

The difference between the two kinds of rules is the same as that between laying down a Rule of the Road, as in the Highway Code, and ordering people where to go; or better still, between providing signposts and commanding people which road to take.

When the government has to decide how many pigs are to be raised or how many busses are to be run, which coal mines are to operate, or what price shoes are to be sold, these decisions cannot be deducted from formal principles or settled for long periods of time. They depend inevitably on the circumstances of the moment, and, in making such decisions, it will always be necessary to balance one against the other the interests of various persons and groups. In the end somebody's views will have to decide whose interests are more important ...[203]

The Obama Administration prioritized social objectives and viewed markets as failing these objectives. Therefore, his Administration felt justified in advancing discretionary and prescriptive government intervention without publicly demonstrating concrete net benefits. From 2008 to 2016, the rules proliferated even faster than usual in health care, environment, finance, consumer products, employment, transportation, and more. What Hayek called substantive rules resulted in over 10 million words of tax rules[204] and 178,277 pages in the Code of Federal Regulations (CFR) as of 2015. The Mercatus Center counted 1,080,000 regulatory restrictions in the CFR at the end of 2016—compared with 400,000 in 1970—and estimated it would take three and one-half years to read.[205]

Figure 4-1

Restrictions in the Code of Federal Regulations

The Obama Administration attributed productivity gains to social regulation, and its Office of Information and Regulatory Affairs (OIRA) showed much larger total benefits than costs from Federal regulation in its annual reports to Congress under the *Regulatory Right-to-Know Act*.[206] For example, the Obama OIRA estimated aggregate annual benefits between $269 and $872 billion and costs between $74 and $110 billion (2014 dollars), for the major Federal regulations it reviewed from October 1, 2005, to September 30, 2015. The 2017 OIRA report released on February 23, 2018, shows even larger annual benefits of rules issued during the last decade, ranging from $287 to $911 billion and estimated costs in a similar range to last year between $78 and $115 billion (2015 dollars).[207]

While regulatory costs clearly depressed business formation and expansion as shown in Chapter 1, OIRA never showed how and when claimed regulatory benefits would increase GDP.[208] Tangible regulatory costs beyond agency expenditures are not

subject to any budget constraint, and they have accumulated much faster than the rate of economic growth.

The vast majority of regulations have not undergone any net benefit test and agency estimates do not include the cost of duplicative, conflicting, or even contradictory rules nor the costs arising from complying with a multiplicity of regulatory requirements. However, even by the regulators' own incomplete estimates, the cumulative regulatory burden has been rising in proportion to the economy.

Figure 4-2 from a study by NERA Consulting shows that the cost growth of major Federal regulation far outstrips GDP growth, and even more so output growth in manufacturing, a sector particularly burdened by prescriptive regulations. From 1998 to 2011, physical manufacturing volume grew by 0.4 percent, real GDP grew by 2.2 percent, and the cumulative cost of major regulations grew by 8.8 percent annually, inflation adjusted, based on NERA's summation of costs calculated by Federal agencies for their own rules.[209]

Figure 4-2

Cumulative Cost of Major Regulations vs. GDP and
Manufacturing Output
1998-2011, Inflation Adjusted

Note: Rules with net present value cost estimates have been annualized assuming a 7% discount rate and 20-year regulatory lifetime.

Sources: OMB dataset; U.S. Department of Commerce, Bureau of Economic Analysis (via Federal Reserve Bank of St. Louis) and U.S. Department of Labor, Bureau of Labor Statistics (via Federal Reserve Bank of St. Louis, NERA analysis.

Those who resort to government prohibitions and mandates should prove their net public benefit. Government policies and mandates that raise workers' "reservation wage, which is the minimum they will work for; impose price and wage controls; or prescribe production methods, product attributes, and terms of employment may serve particular interests and political priorities. However, as Hayek pointed out, they are presumptively counterproductive to the optimal allocation and use of scarce resources.

Containing Growth of Regulations Long-term

Starting in 2017, Congress and the Administration began rolling back the regulatory surge to the greatest extent since Ronald Reagan, but Executive Orders reduced much of the regulatory

burden, and another Administration could reverse those in the future.

One method of preventing a resurgence of rulemaking is to require an affirmative vote of Congress in order for major rules to go into effect and create a statutory requirement that certain regulations be eliminated in order for new ones to go into effect.[210] Another approach would extend cost-benefit analysis to more rules and to all Federal agencies, including independent agencies[211], while establishing a "regulatory budget" that Congress sets to limit the total regulatory burden each Federal agency imposes on the U.S. economy in a given year.[212] This latter approach should include improvements to the analytical methods agencies employ by giving stakeholders a greater say. The results of enhanced cost-benefit analysis then should carry increased legal significance for agency rulemaking and in the adjudication of disputes.

As mentioned earlier, it is also important to compare total regulatory cost growth with the growth rate of the economy. Perhaps fewer rules should be implemented during recessions, for instance, or particular ones introduced only when the economy has recovered, which was a consideration when President Obama delayed EPA's ozone rule in 2011.[213] Applying a more thorough evaluation process to more rules and holding the rate of growth in cumulative regulatory cost to the rate of GDP growth would allow Congress to prevent new cost accumulation from exceeding what the economy can afford. The existing process, by which OIRA sums regulatory costs and benefits of major regulations in an annual report to Congress, lends itself to that approach. Setting a limit for total regulatory cost growth at the rate of GDP growth also would motivate an administration to manage the regulatory state by rescinding ineffective rules, prioritizing implementation of new ones, and devising rules that facilitate rather than hinder market function.

CONCLUSION

As noted in Chapter 2, Government responses to the recession and other policies progressively constrained the economy's potential, and before the surprise outcome of the last election most expected they would continue to do so. The United States fares better when the price and wage system can redirect the allocation of resources and motivate innovative solutions than when the government takes control and expands regulation, bureaucracy, transfers, and taxes. A quantitative regime that contains the growth in cumulative regulatory costs could help assure that Government does not increasingly weaken market function.

Recommendations

> ➢ The design of regulations generally should prioritize enhancing market function rather than attempt to impose preconceived outcomes.

> ➢ Congress should consider reforms that prevent a resurgence of the regulatory burden.

> ➢ OIRA should give priority to rules that benefit the economy. Regulatory benefits often do not increase economic output even though they are monetized in cost-benefit analysis the same as costs. Regulatory costs tend to materialize before the benefits and reduce output.

> ➢ Once the Administration has streamlined the massive existing regulatory burden, it should take steps to stabilize cumulative regulatory costs relative to the size of the economy.

CHAPTER 5: AN EDUCATION AND TRAINING SYSTEM WORTHY OF AMERICAN WORKERS

- Despite massive spending, American high-school students perform far below that of other developed countries.

- Limited vocational and technical training, and choice of school, reduce student preparedness and employment options.

- Federal aid programs incentivize student-debt accumulation, passing costs onto taxpayers.

- High-school and college graduates fail to provide skills demanded by today's employers.

INTRODUCTION

America's education system is an expansive, well-funded combination of public and private, K-12 and post-secondary institutions. Total elementary and secondary enrollment exceeded 55 million in 2015, with 50.3 million students attending public schools and 5.3 million in private schools.[214] College enrollment was 20.2 million in the fall of 2014.[215] Elementary, secondary, and college enrollments are projected to rise in the coming years. In 2013, total public and private spending on all levels of education was 6.2 percent of GDP—higher than all Organization for Economic Cooperation and Development (OECD) countries except for the United Kingdom, New Zealand, Denmark, and Norway.[216] Similarly, American elementary and secondary spending per student was more than all OECD countries except Luxembourg, Switzerland, Norway, and Austria.[217]

Despite considerable funding, K-12 students perform relatively low compared to other countries and post-secondary schools do not always provide students with the required skills for gainful employment. In 2015, American secondary students age 15 ranked 25th internationally in science, 23rd in reading, and 40th in math;[218] and at the end of 2017 the skills gap contributed to nearly 6-million unfilled jobs.[219]

Many Americans attend high-quality K-12 and post-secondary schools that suit the individual needs and interests of the student, while others do not. Elementary and secondary school students often face barriers to a quality education, including State-government policies that force students to attend a public school that is underperforming and/or a poor fit for a child—a school based solely on a student's address. K-12 and post-secondary schools often fail to offer sufficient vocational and technical training for students not pursuing a 4-year degree. Post-secondary education barriers include a lack of awareness of educational options because of an over emphasis on traditional 4-year colleges and universities.

School choice may be beneficial by allowing students to attend a better fit public or private school. Public-school choice includes choice within the same school district (intra-district), in another school district (inter-district), a charter school, or a magnet school. Private-school choice includes tuition assistance in the form of vouchers, individual tax credits or deductions, tax-credit scholarships, and education savings accounts. Parents may also choose homeschooling.[220]

Access to the best-fit post-secondary school is achievable through a trade school, community college, or a traditional 4-year college or university; however, some poorly advised students pursue a 4-year degree, accumulate substantial debt, and yet fail to complete the school program or graduate with an unmarketable degree.

These students may have been better served in a trade school or community college. The result is a skills gap, leaving millions of job openings, and growing taxpayer costs through the inefficient Federal student loan program. By better matching students with the most appropriate post-secondary education—which may not be a 4-year degree—workers, firms, and taxpayers all benefit.

ELEMENTARY AND SECONDARY EDUCATION

In recent years, American student academic scores have fallen. The OECD Program for International Student Assessment (PISA) periodically assesses 15-year-old student performance in science, math, and reading; from 2009-2015, all three discipline's scores have fallen (Figure 5-1). With 90 percent of Americans attending public schools, these scores capture a troubling trend of declining student performance in our nation's public school systems. Another public-education concern is the low 4-year high school graduation rate. Nationally, the 2015 graduation rate was 83 percent, ranging from a low of 69 percent in New Mexico to a high of 91 percent in Iowa. Most minority graduation rates are even lower.[221]

Figure 5-1

For decades, Federal Government attempts to improve public K-12 schools have not led to the desired improvements—low graduation rates and falling performance persist. However, in hope of improving educational outcomes, a growing number of state governments and the Federal Government—in Washington, D.C.—have introduced school-choice options for families who wish to have students attend a school other than their assigned district school. By allowing students—with special needs, who are enrolled in underperforming public schools, or who are in low-income families that are dissatisfied with their children's education—the choice to attend a better-fit school, they are given the opportunity flourish in a more suitable academic environment.

Prior to these recent school-choice expansions, American public education was unusual as a large government-funded program that generally prohibited or greatly limited provider choice. As stated in the *Committee's* December, 2017 analysis, "*The Fiscal Effect of Private-School Vouchers*," Americans are able to choose the

provider of goods or services for most other large government programs.

> *Social Security beneficiaries can choose how they spend their benefits. Medicare and Medicaid recipients generally choose their health care providers. Supplemental Nutritional Assistance Program (SNAP) recipients can choose where they shop. Federal Housing Choice Voucher program recipients can choose where they live, and in fact, the federal government touts the accommodating aspect of housing choice: 'Since housing assistance is provided on behalf of the family or individual, participants are able to find their own housing, including single-family homes, townhouses and apartments.' Thus, adding choice in education is consistent with the tradition of other large government-funded programs'[222]*

Fortunately, a growing number of states and localities are acknowledging school-choice benefits by implementing new programs that help match more students with the most appropriate school. Public school choice expansion includes: a more than doubling of public-charter-school enrollment to more than 3 million from 2008-2017;[223] a 24 percent magnet-school enrollment increase to 2.6 million from 2010-2016;[224] and today all states and Washington D.C.—except for Alabama, Illinois, Maryland, and North Carolina—have clear intra-district or inter-district open enrollment options.[225]

Private-school choice is also expanding. The past 20 years have seen the introduction of new programs and annual student participation rise from roughly 1,000 to more than 450,000 (Figure 5-2).[226] In addition to their popularity—which is evident by the high level of voluntary participation—research finds other

benefits including: higher academic outcomes of choice participants; higher academic outcomes of public schools through competition; lower school racial segregation; and greater student civic values and practices.[227] Also, some school-choice programs offer taxpayer savings and may simultaneously increase public-school per-pupil education spending. For example, private-school vouchers offer families the opportunity to have their child attend a private school paid for by a state-government issued voucher. Taxpayers benefit from lower education costs as voucher amounts are set below the public-school education costs—aggregate estimated 1990-2015 taxpayer savings is $3 billion.[228] Additionally, with relatively stable public-school funding, and fewer students in a school, there is higher per-pupil spending.

Figure 5-2

Annual Private-School Choice Participants

Source: EdChoice

While both public-school and private-school choice expansion are improvements to America's education system, private-school offers a wider range of school options including schools specializing in special-needs students and religious schools—the

latter of which are not publically available—and can save taxpayer dollars.

Public and private schools could serve students better by offering more options in vocational and technical training for the many students who choose not to attend a 4-year college. The German education system offers multiple secondary-school tracks, a college bound track or a vocational track that incorporates apprenticeships. Upon successful vocational completion, students are awarded certification in a trade or field of work.

Economists Edward Lazear and Simon Janssen *Wall Street Journal's* op-ed explain the earnings of German non-college graduates relative to their American counterparts.[229]

> *Germans with vocational apprenticeships earn about 92% of the average German wage; American high-school grads earn only 70% of the average American wage. Germans with vocational apprenticeships are considerably better off than their American counterparts. Data show this to be true for nearly 15 years.*

The skills gap indicates that Americans can be better equipped for post-secondary school employment. School-choice participants represent a small portion of total K-12 students. However, due to new and expanded programs more families are able to have a say in the schools their children attend. Moving forward, the combination of greater school choice and more vocational training will better prepare students for productive post-secondary work.

POST-SECONDARY EDUCATION

About two in three high-school graduates enroll in a 4-year college the following fall semester.[230] Many successfully earn a college degree and have long and rewarding careers, others graduate

without marketable skills, and still others drop out of school; all categories of students often leave college with student debt. Federal intervention in education financing has fueled a number of problems including: tuition inflation; exposing taxpayers to growing Federal student-debt defaults and loan-forgiveness costs; and incentivizing debt accumulation by students. Additionally, the focus on bachelor's degrees, as opposed to technical and vocational training, has failed to close the skills gap, leaving workers unemployed and firms with unfilled positions. Clearly, America can do a better job preparing workers for a successful and rewarding career.

Over the past 30 years, tuition increased 225 percent more than inflation.[231] This increase is partly driven by schools' easy access to Federal student loans. When the Federal Government increases annual student loan amounts, colleges and universities raise their price and absorb the increase. As noted in the 2017 *Response*, a Federal Reserve study found that every subsidized student-loan dollar received by a college increased tuition by 60 cents, and every Pell Grant dollar received increased tuition by 40 cents.[232]

Federal student debt and taxpayer costs are rising. Many students find that the only way to afford a college education is to take out large student loans. Rising costs and the 2010 *Health Care and Education Reconciliation Act*—a Federal takeover of student loans—caused the doubling of Federal student debt in the past 8 years to about $1.4 trillion (see Chapter 1). Federally-run student debt means taxpayers must pay for the five million borrowers who have defaulted.[233] Additionally, the growth of Obama Administration student-loan forgiveness programs such as *Pay as You Earn* (PAYE), *Revised Pay as You Earn* (REPAYE), and *Income Based Repayment* (IBR) add costs by transferring college debt from students to taxpayers. The 2017 *Response* explained that these programs cap repayment amounts at 10 or 15 percent of

discretionary income, and they forgive all outstanding debt after 20 years of payments.[234] *The Wall Street Journal* reports that loan forgiveness programs are pushing the student loan program toward deficits.[235]

Colleges and universities are also unaccountable for Federal student-debt defaults. If a student fails to complete the program or graduates with an unmarketable degree and is unable to make student-loan repayments, the school is financially unaffected. Schools receive Federal dollars during enrollment periods; following graduation, or pre-graduation student separation from the institution, all of the Federal student-debt risk falls on taxpayers.

Many students pursing a bachelor's degree would be better served by pursuing an associate's degree. Columbus State Community College President David T. Harrison explained at the Committee's July 2017 hearing, *A Record Six Million U.S. Job Vacancies: Reasons and Remedies* that overemphasizing a bachelor's degree has caused more than half of these students to reach age 25 without a post-secondary credential or employable skill. Further, he notes the benefits to an associate's degree:

> *Harvard University notes that jobs requiring an associate degree are growing at three times the rate as those requiring a bachelor's degree. Only a third of new jobs will require a bachelor's degree, with the rest requiring an associate degree or technical certificate.*[236]

Today many employers are unable to fill job openings because applicants do not have the necessary skills. As Honda North America's Scot McLemore explained at the Committee's July 2017 hearing, *A Record Six Million U.S. Job Vacancies: Reasons and Remedies*:

Modern manufacturing equipment and processes involve an integration of pneumatic, hydraulic, mechanical and computer network components. Too often individuals do not possess the problem-solving ability, technical training, computer knowledge, or math skills needed to compete in the 21st century workforce.[237]

The skills gap represents an opportunity to better serve Americans who prefer a post-secondary path other than a 4-year degree. High-school guidance counselors and community colleges are the perfect vehicle to inform students of these opportunities. Manhattan Institute's Diana Furchtgott-Roth testified about community colleges' important role for a specific student type at the Committee's July 2017 hearing, *A Record Six Million U.S. Job Vacancies: Reasons and Remedies*:

I performed research using individual students in the State of Florida in 2009, showing that C students, students with a C average, performed much better when they went to community colleges and took a high-return degree. They were earning about $45,000 a year when they graduated…[238]

Programs such as the American Association of Community Colleges Pathways Project guide students toward high-return professions where they can get a good high-earing job upon graduation. Speaker Ryan notes efforts by the House to overcome the skills gap through the *Strengthening Career and Technical Education for the 21st Century Act*, which aims to help equip students for in-demand jobs.[239] Closing the skills gap through vocational and technical training benefits students and taxpayers.

CONCLUSION

America has a strong K-12 and post-secondary education foundation; but through more and better choices and higher-education financing reform, America can more effectively provide all students with the education that best meets their needs. The Trump Administration and Congress are working toward education improvements. Education Secretary, Betsy DeVos's support of local control and more choices will improve K-12 learning and empower parents in their children's education. Legislation such as Senator Lee's *Higher Education Reform and Opportunity Act of 2017* and Representative Foxx's *Promoting Real Opportunity, Success, and Prosperity through Education Reform Act* (PROSPER), among others, address post-secondary education financing inefficiency.

Recommendations

The Committee Majority recommends that policy makers examine alternative approaches to expand opportunities and promote responsible choices, such as:

- ➢ Stop portraying college as necessary for a good career and avoid disparaging vocations that are technical or hands-on.

- ➢ Look for ways to expand more local control in education.

- ➢ Expand and encourage education options including technical and vocational training.

- ➢ Support higher education as an investment good, not as a consumption good, resulting in a net positive return in earnings an education.

CHAPTER 6: INFRASTRUCTURE

- Chapter 4 of the *Report* emphasizes the importance of infrastructure for economic growth and points out that supply has not kept up with increasing demand.

- The *Report's* primary emphasis on how infrastructure affects productivity stands in contrast to the Obama Administration's emphasis on demand stimulus.

- The funding mechanisms for public infrastructure projects are often problematic.

- Overregulation has slowed public and private infrastructure investment.

PUBLIC VS. PRIVATE INFRASTRUCTURE

What is Infrastructure?

The nature of a debate can change the use of critical terms, and their changing meaning in turn can affect the debate over time. For example, regulation has become synonymous with restriction and prescription, but what is often forgotten is that regulation can also be enabling and facilitating (see Chapter 4 on regulation).

"Infrastructure" is another term that has taken on a particular meaning in policy discussions with a tendency to limit relevant considerations and narrow the range of policy options deemed appropriate. The term "infrastructure" is often used synonymously with public infrastructure, but such a premise is far too narrow.

In the context of a national economy, infrastructure assets are long-lived fixed assets that have an intermediate role in many supply chains for widely used goods or services. The private sector

builds and maintains most infrastructure, which is not prone to systemic deficiencies and generally functions well. Under particular circumstances, government involvement can enhance economic efficiency—such as when it is difficult to collect a service charge from users—but different levels of government— Federal, State, or local—can choose from a range of measures short of public ownership and operation to facilitate the supply of infrastructure services. Indeed, various business models exist in other countries for providing a given infrastructure service.

Infrastructure Provision Is by No Means an Exclusive Government Function.

Infrastructure takes many forms and is supplied primarily by the private sector (Figure 6-1). In 2015, the Federal nondefense portion of gross fixed nonresidential investment was less than 6 percent. Federal, State, and local governments' combined portion was only 16 percent. Private investment in pipelines, power plants, satellites, cell towers, and so on—some of which also are considered public utilities or common carriers and regulated as such by the government—far exceeds government investment in projects such as highways, schools, and urban transit systems. If one excludes even half of private-sector gross domestic fixed investment as non-infrastructure, it still far exceeds what governments invest.

Figure 6-1

Gross Domestic Fixed Investment in 2016, $Billions

Sources: BEA, OMB

Petroleum pipelines are a good example of private infrastructure. Networks of crude oil, refined products, and natural gas pipelines that are built and operated by private firms traverse the country (see *Report*, p. 206). Pipelines have the same common use characteristic as highways, which State governments typically fund.

When critics say "American infrastructure is crumbling," they are generally referring to roads and bridges. Yet the claim does not apply to most infrastructure, certainly not the private portion and not even the much smaller public portion. The number of structurally deficient bridges declined from 138,000 in 1990 to 56,000 in 2016 (Figure 6-2),[240] even as the number of highway bridges increased. Highway pavement has similarly improved. America's rail transit systems, on the other hand, are deteriorating.

Figure 6-2

Structurally Deficient Bridges

Source: U.S. Department of Transportation

It is important to identify the specific reasons why certain kinds of public infrastructure are in poor condition. The reason could be that a government is not the right entity to own and/or operate the kind of infrastructure in question. Alternatively, the wrong level of government carries out the function, or that the government is not financing it in the right way.

The vast majority of structurally deficient bridges and roads are locally owned. States pay for road maintenance almost entirely out of user fees, while local governments pay for it with a combination of taxes and user fees. State and local transportation agencies collect about $2 in fuel taxes, tolls, transit fares, and other user fees for every dollar of Federal fuel taxes collected. Mass transit agencies, on the other hand, are not spending enough on the maintenance that they fund entirely with taxes. The quality of public infrastructure maintenance is inversely related to the share financed with general tax revenue.[241]

The line between government-administered and private-sector infrastructure is not the same in all countries. Over the past three decades, thousands of state-owned enterprises around the world have been sold to private buyers for trillions of dollars. Several other countries have privatized airports and harbors, for example, while they remain under government ownership and operation in the United States.[242] So-called public-private partnerships (P3s) have gained favor in other parts of the world. Privatization can take different forms and degrees. Governments may retain full or partial ownership and/or contract out operation and maintenance of facilities to private contractors, or they may allow private firms to build, manage, and profit from facilities under long-term leases. Alternatively, Canada fully privatized its air traffic control system by establishing a self-funding nonprofit corporation. Different governments do not necessarily exercise control over particular kinds of infrastructure the same way.

Different Reasons and Models for Government Infrastructure Provision.

Several considerations enter into whether and to what extent governments have a role in building and operating infrastructure. One is how difficult it is to charge for usage. Tollbooths and weigh stations introduce costs that in many cases make it prohibitive for private investors to recover their investment and earn a return from operating a road. In addition, traditional methods of collecting use charges from drivers cause traffic congestion and shipping delays. Governments have the power to tax and therefore can finance roads that otherwise would not be built even though they yield a net benefit.[243]

Another consideration is economies of scale relative to the size of the market. If scale economies lead to provision by a single supplier who can realize the lowest cost by virtue of supplying the

entire market, a so-called natural monopoly, then the supplier can restrict the quantity and charge a price above cost. The presumption of natural monopoly has led governments to nationalize the providers in some cases (postal services) or to regulate them as utilities (electricity) or common carriers (telecommunications).[244]

A further reason for government involvement is "eminent domain." The negotiation and transaction costs of obtaining rights of way from many individual property owners may be prohibitive for a private undertaking, blocking projects in which the value exceeds that of the use rights given up by the private property owners. Governments have the power to reduce negotiating and transactions costs and clear the way for investments that have a net benefit for society.

It bears emphasis that realizing greater public interest benefits through government financing of infrastructure, curtailing the potential for private market power, and overriding individual ownership rights can take varying forms and degrees. And it certainly does not imply that the government must replace private ownership and operation. A government should nationalize a function only for the most compelling reasons, because it thereby removes profitability as a gauge for value creation and the spur to achieve success. The persistently dismal conditions of some publicly owned and operated facilities and services (e.g., schools, mass transit systems, airports), derive from lack of accountability and corrective action that private stakeholders would demand if they were incurring losses.

A very important consideration is that the deeper a government's involvement in supply, the more likely it will slow technological advancement. The concept of a natural monopoly, for example, holds technology constant. But technologies may develop that enable new market entrants to achieve lower costs and better

service than those of the "natural monopolist." Utility and common carrier regulation—not to mention nationalization— protects existing suppliers and their methods from competition, delaying innovation.

Which Levels of Government Should Deal with Infrastructure?

The debate over infrastructure investment is taking place at the national level but most of the benefits are regional. Those who benefit should be the ones to pay for the cost and those who pay the cost should have oversight responsibility. Separating costs, benefits, and oversight invites inefficiency. Appropriately, States and localities build and operate most public infrastructure for this reason. To the extent that certain infrastructure facilities are beneficial nationally, supplemental Federal funding granted States and localities to increase supply may be useful, but the mechanism must not distort their incentives to invest in and maintain the facilities.

Is Infrastructure a Tool to Manage the Business Cycle?

The previous Administration represented debt-financed public infrastructure spending as a demand stimulus for the economy during the last recession, but long lead times make infrastructure generally ill-suited to accomplish countercyclical spending objectives. Long-lived fixed assets with a purpose of meeting specific, varied needs around the country that each take time to plan, implement, and construct cannot be accelerated in unison to lend the economy a short-term demand boost, whether they are public or private, debt or equity financed. Accordingly, President Obama found that there were not many "shovel ready" projects.

Governments can crowd out private investments that are more valuable by paying for preferred projects with higher taxes or by bidding up interest rates based on the power to raise future taxes.

Funding low-value projects this way is no less wasteful during a recession than afterwards. At full employment, the adverse effect may be more immediately apparent if better projects in progress lose funding as a result, but wasteful government spending during recessions will become apparent soon enough.

Productive infrastructure projects should also not be singled out and held back just because the economy is at full employment. The concern that infrastructure spending will be inflationary is misplaced, even when it is debt financed.[245] If there is an urgent need, then the benefit from addressing it presumably is greater than from some other investment, and the country should not have to wait until the next recession.

Productive infrastructure spending is an intermediate link in many supply chains that sustains and augments the economy's productive capabilities. Useful infrastructure strengthens the economy's supply potential just as factories, warehouses, and trucks. It thus will serve to reduce scarcity and prices. Financing construction of pipelines and bridges is not inherently more or less important than financing other worthwhile projects and should compete with their use of capital. Overinvestment can occur in an industry—as in the telecommunications industry during the late 1990s—but that by itself will not lead to inflation, because money that went into laying optic fiber cable was not available for other uses. When projects compete on an equal footing for the capital they use, they do not "overheat" the economy.

Problems with Regulation and Bureaucracy

Construction permits, regulations, and legal challenges combine to delay or thwart many projects. Nowhere is this more evident than with infrastructure. Bureaucracies and their approval process are often unaccountable and dysfunctional, as *The Rule of Nobody*,[246] for instance, documents. Many projects are held up for

inordinate periods, including ones an administration especially desires. The deadline for completion of the California bullet train's first segment, initially mandated in 2010, was extended to 2022.[247] High-speed rail is the kind of project the Obama Administration and members of the same party favored. Larry Summers, former National Economic Council director in the Obama White House, complained bitterly about the drawn-out repair of a bridge connecting Boston and Harvard Square that began in 2012, which took five times longer to repair than it to build a century ago.[248]

Figure 6-3

Figure 6-3 shows the cumulative laws and amendments applied to transportation for environmental protection alone. Before appropriating more money to infrastructure projects, it would appear prudent first to remove extraneous obstacles to building them.

CONCLUSION

There are inefficient aspects to the way the Federal Government supports infrastructure development; many obstacles exist in current law and rules that hinder the use of alternative models involving privatization; and Federal regulation of constructing and renovating projects causes inordinate delays. It is no exaggeration to say that the Government essentially has lost control over the permitting process and the ability to deliver, even on infrastructure it particularly favors. The legal means to deliberately block construction are vast, and bureaucratic inertia itself makes it impossible to hold to a schedule.

From this perspective, it is highly appropriate to reevaluate the division of responsibilities among Federal, State, and local governments; try new business models involving the private sector; and explore ways to streamline the regulatory requirements construction projects face in this country. The Trump Administration infrastructure plan would seem to do so.

Recommendations

> ➤ For purposes of organizing infrastructure provision, it is best not to think of it as a unique segment of the economy that calls for government control, but to focus on the costs and benefits of particular functions the government may perform.

> ➤ In this connection, it is important to consider the effect that government's supply of infrastructure services has on technological progress. New technologies may greatly enhance existing forms of infrastructure and new forms may change their "public good" character.

> ➤ The incentives created by government support of infrastructure projects are critical. The terms of

government subsidies, private contracting, and privatization determine success more than appropriations to infrastructure projects. Further, overregulation and bureaucratization can thwart the best models for infrastructure provision and must be remedied.

CHAPTER 7: ENHANCING U.S. TRADE IN A GLOBAL ECONOMY

- The *Report* highlights that American exporters generally face higher trade barriers in other countries than foreign exports face upon entering the United States.

- China, in particular, is not playing by competitive market rules and has been causing market distortions.

- America's approach to disagreements with other countries over the terms of trade requires careful consideration as retreat from trade liberalization will harm the domestic economy. For instance, imposing tariffs on steel and aluminum, which are inputs to many products, is disconcerting.

- The United States possesses a comparative advantage in digital trade as well as energy and agriculture with which it may be able to increase export earnings.

- This chapter of the *Response* focuses on the issue of digital trade, which the Committee has studied extensively.

DIGITAL TRANSFORMATION OF THE ECONOMY

Digital technology and the internet have transformed the economy's information processing, storage, communications, and transmission capabilities. Through countless applications, entirely new products and services have been created and conventional ones enhanced or replaced. Advances in digital technology and the internet continually accelerate production and distribution methods at lower costs, higher quality, and with more customization. These advances have facilitated management of global supply chains and international banking on a higher level.

The advances expand markets and give rise to startup firms. Digital technology has developed more rapidly in the United States than in most countries, but it has spread around the world, shaping international trade.

Digital trade includes a wide range of products—from movies and video games to the means of facilitating physical goods and services trade. The U.S. International Trade Commission (USITC) defines digital trade as "U.S. domestic commerce and international trade in which the internet and internet-based technologies play a particularly significant role in ordering, producing, or delivering products and services." Examples include orders received on e-commerce websites, such as Amazon and eBay; email and voice over internet protocol (VoIP); electronic banking; and data transmissions to manage global supply chains.[249]

At the Committee's September 2017 hearing, *The Dynamic Gains from Free Digital Trade for the U.S. Economy*, Chairman Paulsen emphasized the importance of advancing in this area:

> *There are hundreds of thousands of U.S. small businesses in nearly every sector, from manufacturing, to financial services, to mining, to agriculture, and food, in every single state and every Congressional District across the country that are harnessing the power of the internet and technology to reach new customers around the world. Digital trade accounts for more than half of all U.S. service exports. Digital trade is responsible for nearly 6.7 million American jobs. Nearly half of all U.S. companies have an online trading relationship with the EU, and the U.S. runs a $159 billion trade surplus in digitally deliverable services.[250]*

Vice Chairman Lee observed, "We are swiftly approaching the point where the word 'digital' will be an unnecessary adjective for trade."

DYNAMIC GAINS FROM DIGITAL TRADE

The basic case for international trade is that national resources move to uses in which a country has a comparative advantage—production tends to specialize in what a country does best. The U.S. economic system has a comparative advantage in bringing innovations to market, which is particularly important as digital development opens up ever more possibilities. The $159 billion digitally deliverable trade surplus referenced by Chairman Paulsen resulted from $399.7 billion in exports and $240.8 billion in imports in 2014, according to the U.S. Commerce Department. The surplus increased by 19 percent from 2011 to 2014.[251]

The United States is a leader in both connectedness and content production. McKinsey Global Institute's "Connectedness Index" measures how much countries participate in digital trade and their openness to trade flows. America ranks third on the "Connectedness Index," trailing only Singapore and the Netherlands, and America produces more than half of online content consumed in all regions outside Europe.[252]

U.S. firms have been the pioneers on the digital/internet technology frontier and are global leaders. Their pursuit of digital trade and investment internationally yields large dynamic gains that provide ongoing benefits for the United States. Digital trade increases economies of scale, product and service variety, and productivity. It continually reduces import costs for domestic production processes and increases potential export earnings. Advancements in digital technology and its widening applications mean digital trade's scope is growing and capable of delivering

ongoing improvements in production, distribution, and value delivered to Americans.

Economic Impact

USITC estimated that U.S. domestic and international digital trade added 3.4 to 4.8 percent ($517 billion to $710.7 billion) to U.S. GDP in 2011 and that digital trade increased real wages by 4.5 to 5.0 percent while adding up to 2.4 million jobs.[253]

McKinsey Global Institute estimated the contributions from increased digital globalization and found it contributed 10 percent to global GDP, or $7.8 trillion in 2014 dollars—almost equivalent to half the U.S. economy in extra global value.[254] Further, 12 percent of global goods now trade via digital platforms, and digitally delivered services doubled in value during the past decade to $2.4 trillion in 2014, or approximately half of the world's traded services.[255] From 2007 to 2014, cross-border internet capacity expanded by 38 percent annually.[256]

The McKinsey Global Institute found strong evidence that global data flows—both inflows and outflows—raise productivity by improving operating efficiency, extending economies of scale, tapping wider pools of talent and ideas, and increasing foreign direct investment. Dan Griswold's testimony explained:

> *The impact of digital trade on the US economy is not a one-time shift but an ongoing process that enhances the dynamic, long-term growth potential of the US economy. By reducing costs, spurring competition, and expanding markets, digital trade creates ongoing gains in efficiency that fuel productivity gains. By facilitating the spread of ideas and collaboration, digital trade contributes to product innovation. By playing to America's competitive strengths, digital trade allows us as a*

> *nation to use our physical, intellectual, and human capital in ways that permanently boost our gross domestic product and general living standards.*

Barriers to Digital Trade

> *... [I]f an economist wrote a free trade deal, then it would be one sentence. We would say: We got free trade. (CEA Chairman Kevin Hassett, JEC hearing "The Economic Outlook," October 25, 2017).*[257]

Digital technologies raise issues regarding protection of private property rights and contract enforcement that in principle are no different from conventional commerce. The former includes intellectual property such as trademarks, patents, copyrights, and rights to private information. Ensuring compatibility of technical standards in different countries is also important.

Governments introducing legal definitions, regulations, and technical standards can facilitate trade and innovation, but such actions can also be a hindrance—either inadvertently or by design. Rules and standards can all too easily constrain the use of better or more suitable technology. It bears emphasis that regulation should follow technology and not get in the way of market adaptation.

U.S. laws and regulations have largely allowed digital and internet applications to progress.[258] However, in other countries impediments to innovation and digital trade can seriously hinder expansion. World Trade Organization (WTO) frameworks cover some aspects of digital trade, but there is no comprehensive WTO agreement on digital trade. In 1998, WTO members agreed not to impose customs duties on electronic transmissions, but the agreement is neither permanent nor legally binding. Members have been renewing it at each WTO conference. Furthermore, the definition of electronic transmissions is not precise and members

continue to debate it.[259] Bilateral or multilateral agreements have only recently begun to address digital trade issues.

The Office of the U.S. Trade Representative identified a number of key barriers to digital trade, such as China's government filtering cross-border internet traffic, blocking websites, and imposing redundant testing requirements for mobile phones; Russia's government requiring certain data to be stored and processed in country; and Brazil's requirement that foreign winners of spectrum-use rights in Brazil favor domestic technology, services, equipment, and materials for their networks. In 2015, Indonesia issued a regulation that appears to require all 4G-enabled devices to contain 30 percent local content, and all 4G base stations to contain 40 percent local content. Telecommunications operators in several EU Member States, including Portugal, Czech Republic, Croatia, Greece, and France, apply higher rates to phone calls if they originate outside the EU.[260] The French government promotes the use of *le cloud souverain*—the sovereign cloud—while Germany, as of July 1, requires local storage of telecommunications metadata.[261]

The reasons governments may want to impose tariffs or surcharges on digital trade or manage, condition, and limit digital trade are largely familiar: raising revenue for the state, protecting domestic firms and employment from foreign competition, nurturing particular domestic industries or technologies, and furthering national security interests.

In the digital era, certain interests and concerns are more pronounced than in the past. The ease of moving proprietary information across borders and a desire for preserving data privacy may motivate national requirements for local data storage, although physical location has little to do with securing data.[262] The fear of falling behind in extraordinarily fast-paced technological developments or a desire to jump ahead also may

motivate requirements for national participation in data storage and processing; this may even include demands for foreign technology transfers.

USITC estimated that in 2011 the removal of foreign barriers to digital trade would have increased real GDP by 0.1 to 0.3 percent ($16.7 billion to $41.4 billion), real wages by 0.7 to 1.4 percent, and full-time equivalent employment by up to 400,000 in the United States.[263] A study commissioned by the U.S. Chamber of Commerce found that reducing market and regulatory barriers to cross-border information and communication technology (ICT) services could produce $1.72 trillion in global GDP gains, create millions of new jobs, and generate billions of dollars in potential new Government revenues.[264]

It is important to recognize that non-tariff barriers can become embedded in national regulatory regimes, even unintentionally. Sean Heather, Vice President of the U.S. Chamber of Commerce's Center for Global Regulatory Cooperation (GRC), noted at the Committee's digital trade hearing that the European Union's General Data Protection Regulation (GDPR), for instance, is not necessarily a traditional trade problem.

Complying with multiple national regulations raises costs and thwarts trade. Capitalizing on digital technology's potential to make international trade seamless requires regulatory harmonization. Heather referred to emerging rules in different countries for autonomous vehicles and challenged regulators and legislators to reorient their thinking:

> There's a huge role here that goes beyond Commerce and State and USTR [U.S. Trade Representative] that goes to … the mainline regulatory agencies that this Congress created in many cases 100 years ago before there were

international markets. And these regulatory agencies all have offices of international affairs, but they aren't central to the policymaking function of these agencies. ... [O]nce we've decided on a regulatory model we think works here, why aren't we out there advocating it to the rest of the world?

Former State Department Ambassador Daniel Sepulveda seconded this concern at the hearing:

The United States needs to lead the way with workable solutions to these challenges or we will end up dealing with a global patchwork of laws and regulations that end up doing more harm than good, and splintering the global Internet.

If America does not engage and seek harmonization, we could quickly end up in a morass of international red tape that will prevent small businesses from navigating.

Rules for Digital Trading

How to appropriately conduct regulation and standard setting is an important question. Although universal rules would be desirable, establishing them through the WTO is an arduous task that may never come to fruition because it requires consensus among all members.

The U.S.-Korea Free Trade Agreement was the first U.S. agreement to include a chapter on digital commerce, guaranteeing the movement of data and digital items without tariffs or fees.[265] Congress subsequently codified instructions for digital trade negotiations. In 2015, Congress passed and President Obama signed the *Bipartisan Congressional Trade Priorities and Accountability Act of 2015*, known as Trade Promotion Authority

(TPA).[266] TPA instructs U.S. negotiators to ensure that foreign governments allow cross-border data flows; do not require local storage or processing of data; and refrain from imposing other impediments on digital trade. Additionally, U.S. trade representatives are directed to seek openness, transparency, and harmonization of standards to encourage cross-border investment and trade. TPA also sets the negotiating objective of a permanent WTO moratorium on duties for electronic transmissions.[267]

Using trade agreements to negotiate digital rules may be more manageable, but also risks becoming tangled in other trade matters and even non-trade matters inserted into trade negotiations, such as environmental and workplace conditions. The fate of the Trans-Pacific Partnership (TPP) illustrates how generally well-regarded rules for digital trade were not adopted because they were part of a larger, controversial agreement.[268]

Chairman Paulsen and Rep. Suzan DelBene launched the Bipartisan Digital Trade Caucus in May 2017. The Caucus aims to engage fellow policymakers and promote American leadership in the digital economy.[269]

Digital Trade as Equalizer

Small and medium sized enterprises (SMEs) that previously could not afford the initial investment and/or operating costs are able to import and export goods and services through the internet. Digital devices and services and the internet lower entry and operating costs in many international markets, which reduces the minimum required firm size. A local small business with a computer (or even a smartphone) and a worldwide web connection now has the capacity to do what was once possible only for larger firms, such as advertising abroad. This boosts domestic production and employment, and it may introduce more competition to the benefit of consumers.

According to the Boston Consulting Group, SMEs that are heavy internet users are 50 percent more likely to sell outside their immediate region and 63 percent more likely to source products and services from afar.[270] Another Boston Consulting Group study found SMEs that were high web users realized 10 percent sales growth on average during the previous three years, while SMEs that were low web users or had no presence online experienced sales declines over the same period.[271] Similarly, when McKinsey surveyed small businesses around the world in 2011, it found firms with a strong web presence grew twice as fast as companies with little or no web presence.[272] With ever-expanding smartphones and network coverage, this trend will likely continue.

The digital ubiquity has been so powerful that smaller firms are exporting at rates similar to their larger competitors. For example, eBay found that 94 percent of small firms engage in exports, comparable to the 97 percent rate of the largest firms.[273] Even on the American craft site Etsy, approximately one-third of all transactions involve buyers or sellers outside of the U.S.[274] Such trends prompted researchers to coin new terms such as "micro-multinational" and "born global." Micro-multinationals are smaller firms that can navigate into new international markets as well as their larger counterparts, and "born global" or "global on day one" refers to an entrepreneur's ability to conduct business globally with no longer lead-time than domestically.

All the witnesses at JEC's September 2017 trade hearing expressed full agreement that raising the *de minimis* threshold for duty-free goods around the world would accommodate many more opportunities for cross-border sales by small- and medium-sized businesses.

Figure 7-1

The United States sets the standard for *de minimis*

Source: UPS

Conclusion

International trade is beneficial because it offers more choices to American consumers and allows gains from greater specialization in production. Digital trade, in particular, also continually lowers costs as it grows and transforms the ways in which trade is conducted, whereby technological advancements expand its applications ever further. "Blockchain," for example, is a secure transmission and recordkeeping technology in its infancy with vast potential to revolutionize the forms in which we transact and document commercial activity of virtually any kind around the world (see Chapter 9).[275] The "Internet of Things,"[276] which is projected to connect more than 50 billion devices by 2020,[277] drones, and autonomous vehicles are other examples of new technologies that are in the early stages of development. It is critical for future U.S. economic success to ensure a regulatory setting in which innovators, entrepreneurs, and businesses of any

shape and size can experiment with new technology, are free to compete, and adopt the best methods of supply.

That applies both domestically and internationally. Free external trade is good for the economy but free internal trade is no less important. An overregulated, overtaxed domestic economy cannot realize maximum gains from trade. On the contrary, domestic market rigidity is prone to creating tensions with imports and forgoing opportunities for export earnings.

Recommendations

> ➢ Raise *de minimis* thresholds for duty free trade of low-value goods, and expedite the customs process with electronic customs forms, electronic signature and authentication, electronic labeling, and secure on-line payment.

> ➢ Prohibit customs duties on electronic transmissions.

> ➢ Prohibit measures that condition market access on localization of data; require use of local technology infrastructure; sharing software source code or algorithms; or discriminate against U.S. companies, products, and services.

CHAPTER 8: ADDRESSING HEALTHCARE CHALLENGES THROUGH INNOVATION

- Chapter 6 of the *Report* outlines many of the failures of the *Affordable Care Act* (ACA). CEA notes that expanded insurance coverage from the ACA did not translate into improved health outcomes.

- CEA also provides economic analysis of the healthcare industry and its regulatory framework, identifying reasons and remedies for public dissatisfaction with existing practices and conditions such as pharmaceutical pricing.

- CEA also mentions Administration efforts to combat the opioid epidemic—a topic the JEC has studied extensively.

- The JEC Majority agrees that the ACA failed to improve health outcomes and instead left patients with fewer choices, less flexibility, rising costs, and higher taxes.

- The ACA also reduced economic potential by damaging incentives to work, which limits both the economic mobility of low-income Americans and the health of the economy they live in.

- Though Congress was unable to pass a full repeal and replacement of the flawed ACA, Congress and the Administration have made progress in addressing some of the more harmful aspects of the ACA.

- Rising healthcare costs, an aging population, and a broken healthcare system require more innovative solutions for delivering quality health care in a cost-effective manner.

THE HEALTH SYSTEM AFTER THE AFFORDABLE CARE ACT

Before the ACA, the vast majority of insured Americans were covered either through a plan offered by their employer or a Government program such as Medicare, Medicaid, the State Children's Health Insurance Program (CHIP), or plans through the Departments of Defense or Veterans Affairs. The same is true after the ACA. These types of programs already offered protections for those with pre-existing medical conditions before the ACA. People without this kind of coverage could seek health insurance through the individual (non-group) insurance market regulated by States. However, people with pre-existing conditions sometimes had difficulty affording or obtaining coverage in the individual market.

Prior to ACA enactment, national healthcare spending represented a larger share of the U.S. economy than similar measures in other developed economies. Supporters of the ACA claimed that the law would provide universal health insurance coverage for Americans at a lower cost.

A Failed Design

The ACA expanded the Medicaid program beyond its original mission of serving vulnerable Americans below the poverty line, requiring States to expand Medicaid coverage to able-bodied adults with incomes up to 138 percent of the Federal poverty level. The U.S. Supreme Court subsequently made this requirement voluntary through its decision in *National Federation of Independent Business v. Sebelius*.[278]

The ACA also established a Federal health insurance marketplace for States that elected not to create their own exchange. Individuals without employer-sponsored insurance or coverage by a Government program—but with incomes too high to qualify for Medicaid—were required to purchase insurance that met ACA's

strict requirements, either through the ACA-established marketplace exchanges or otherwise through the individual market. Those who choose insurance through Federal or State exchanges with incomes between 133 percent and 400 percent of the poverty line are eligible for Federal subsidies through premium tax credits, which are sent directly to the insurer they select.[279]

Consumers lost flexibility in choosing an insurance plan because the ACA required all health insurance plans to meet federally mandated minimum standards, including requiring them to cover types of care an individual may not want or need.[280] After the ACA's enactment, millions of people who were enrolled in health plans received notices that their plan would no longer be offered because it did not fully comply with ACA mandates.[281] By some estimates, roughly four million Americans lost their health insurance.[282]

The ACA also prohibited those eligible for Medicaid from receiving insurance subsidies in the exchanges. In States that did not expand Medicaid income eligibility to 138 percent, ACA guidelines required individuals to earn at least 100 percent of the poverty level to qualify for a premium subsidy. That left roughly 2.5 million low-income Americans below 100 percent of the poverty level with no meaningful coverage option, since they earned too much to qualify for traditional Medicaid and too little to get help affording a private plan.[283]

In order to enforce the requirement that Americans have insurance that meets strict ACA requirements, the ACA created a tax on uninsured Americans known as the individual mandate designed to become more severe over time. As of 2017, the tax was the higher of 2.5 percent of household income or $695 per adult and $347.50 per child.[284]

Over the past year, the JEC Majority has documented the failures of the ACA. Premiums have skyrocketed in the individual market, with an average premium increase in the Federal exchange of 105 percent from 2013 to 2017.[285] In 2018, the average premium for 27-year-olds—a relatively healthy and low-cost demographic—is 37 percent higher than in 2017.[286]

Even with Federal subsidies for premiums, consumers with ACA plans are facing higher out-of-pocket costs through rising deductibles,[287] limited choices of doctors and hospitals, and a shrinking number of insurance choices. The Centers for Medicare and Medicaid Services (CMS) recently estimated that almost 30 percent of enrollees will have only one insurer to choose from in the ACA exchanges this year.[288]

Because the ACA limits the ability of health insurers to vary premiums based on age, the ACA exchanges continue to lack the 40 percent of young, healthy enrollees needed to keep premiums stable.[289] The population that remains in the exchanges tends to be older, sicker, and costlier. Unsurprisingly, enrollment in the exchanges is dwindling. When ACA became law in 2010, actuaries for CMS predicted that over 31 million Americans would have insurance through the exchanges in 2018,[290] while CBO projected 24 million.[291] As of the end of open season for enrollment, only 8.7 million had signed up for 2018 coverage, and many of those will drop out by not paying monthly premiums.[292]

Rising Healthcare Costs

During President Obama's first year in office in 2009, National health expenditures—which include the amount Federal and State governments, individuals and institutions spend on health care—represented 17.3 percent of GDP, larger than the ratios in other developed economies.[293] This was often cited by proponents of the ACA as a reason to reform the healthcare system. However, following implementation of the ACA exchanges and Medicaid expansion, health spending began consuming a growing share of the U.S. economy. CMS recently projected that health spending will represent nearly 20 percent of the economy by 2025 (Figure 8-1).

Figure 8-1

National Health Expenditures as a Percent of Gross Domestic Product

Source: CMS

This cannot be attributed solely to an aging population, since both private- and public-sector spending are growing at faster rates in the U.S. than in other comparable countries with similar demographic challenges.[294]

Even before this surge in spending that followed ACA implementation, a 2011 study featured by the National Institutes of Health observed, "The fraction of GDP devoted to health care in the United States is the highest in the world and rising rapidly."[295] The authors concluded that high levels of spending would lead to future tax increases:

> With almost half of health expenditures publicly financed and the prospect of further government subsidization of health insurance under health care reform, the rising burden of health care spending during the next half-century will most likely necessitate large increases in tax rates.

As outlined in previous chapters of this *Response*, large tax increases can have very damaging effects on economic growth.

The Tax Burden Imposed by the ACA

In addition to threatening future tax increases, the ACA imposed over $1 trillion in new taxes, many of which damaged the economy and drove up the cost of health care. Importantly, despite President Obama's pledge not to raise taxes on those making less than $200,000 ($250,000 if filing jointly) per year,[296] several of the taxes hit Americans with incomes far below that threshold.[297] The Joint Committee on Taxation (JCT) confirmed that many ACA taxes affect lower-income taxpayers, either directly by increasing their tax burden or indirectly through higher consumer prices arising from taxes on insurance and healthcare products.[298]

A particularly harmful provision in ACA that raised the cost of health care for consumers is the medical device excise tax, which also operates as a tax on innovation. According to one estimate, when it is in effect the 2.3 percent excise tax reduces research and

development (R&D) investments by $2 billion per year, depriving patients of potentially lifesaving breakthroughs.[299]

Because the device tax is based on gross sales and not profits, it is particularly harmful to small companies that are not yet profitable but are struggling to launch innovative devices.[300] Additionally, before Congress temporarily suspended the tax for 2016 and 2017, there was evidence it caused job losses even among large companies.[301] In fact, when the tax was in effect from 2013 to 2015, Census data indicated it caused the loss of an estimated 28,800 jobs in the medical device industry.[302] Another study calculated that full repeal of the tax could net more than 53,000 additional jobs:

> *If the tax is permanently repealed, it is likely that the 28,800 jobs lost when the tax was in effect will be recovered within three to five years. Combined with the 25,000 jobs projected to be lost upon resumption of the tax, permanently repealing the medical device tax could net an excess of 53,000 additional jobs, compared to current law.*[303]

According to an industry survey, 71 percent of companies would reinstate previously foregone hiring and 85 percent would reinstate foregone R&D investments if the tax were repealed.[304] These are some of the reasons that efforts to repeal the device tax—led by JEC Chairman Paulsen in the House and Senate Finance Committee Chairman Orrin Hatch in the Senate—have gained such broad bipartisan support.[305]

The device tax was recently suspended for two additional years, 2018 and 2019, in the *Extension of Continuing Appropriations Act of 2018* (ECAA). However, the JEC Majority strongly recommends full repeal to lower health costs, spur greater innovation, prevent job losses, maintain the U.S. competitive edge

in medical technology,[306] and preserve patients' access to devices that save and improve lives.

ACA also raised health costs by imposing taxes on manufacturers and importers of brand-name drugs. Patients have very little discretion to forgo a medication when it becomes more expensive, which makes the tax likely to be passed to consumers in the form of higher prices.[307] According to Tax Foundation analysis, the tax may have contributed to recent spikes in prescription drug costs.[308]

Another ACA tax increase discourages employers from offering prescription drug coverage to their retirees. When Congress created Medicare Part D to provide seniors with prescription drug coverage, the law provided a tax incentive for companies to maintain retiree drug coverage out of concern that they might otherwise drop the coverage and shift costs to retirees and Medicare.[309] The ACA repealed the 28 percent deduction for retiree coverage, which human resources professionals warned would likely cause retirees to lose access to employer drug plans.[310]

In addition to indirect taxes that affect low-and middle-income taxpayers through higher costs, the ACA imposed direct taxes affecting people who are far from wealthy. As explained in Chapter 3 of this *Response*, the ACA's penalty tax on uninsured Americans through the individual mandate was paid disproportionately by Americans with incomes less than $50,000. At the same time, studies by ACA architect Jonathan Gruber and other researchers found that the individual mandate was ineffective at boosting insurance coverage.[311]

Chapter 3 also explained how the ACA made catastrophic health costs more unaffordable by slashing the medical expense deduction, which is primarily used by Americans with less than $100,000 in income.

The ACA also placed a limit on healthcare flexible spending arrangements (FSAs), which made it more difficult for families to manage rising out-of-pocket expenses. FSAs are offered by employers and allow workers to set aside a portion of their paychecks on a pre-tax basis for out-of-pocket medical costs. The ACA cap on FSAs is particularly burdensome for families with many children, those who are dealing with multiple chronic conditions,[312] or who use FSAs to finance services for children with special needs.[313]

Additionally, the ACA raised the penalty tax on certain withdrawals from Health Savings Accounts (HSAs). HSAs combine the benefit of a lower-premium high deductible health plan with a tax-free savings account to cover out-of-pocket medical expenses. Previously, when consumers withdrew funds from an HSA for unexpected non-medical expenses, the rules were similar to those governing retirement accounts—the funds would be taxable and a 10 percent penalty applied. The ACA doubled the HSA penalty to 20 percent, making it more difficult for families facing situations like sudden job loss.

Over-the-counter (OTC) medications also became less affordable under the ACA. OTC medications theoretically allow consumers to treat their ailments without the inconvenience and expense of dealing with the healthcare system. Previously, Americans could easily use tax-free FSAs, HSAs, or Health Reimbursement Accounts (HRAs) to purchase OTC products like allergy medications or smoking cessation aids. The ACA prohibits using these accounts for OTC medicines unless consumers first obtain a doctor's prescription, causing more costly interactions with the health system.[314]

The ACA not only imposed taxes on those without health insurance, but also on those who are insured. One of the ACA's taxes on private insurers known as the health insurance tax (HIT)

was passed directly to consumers in the form of higher premiums and it even appeared as a line item on monthly premium bills.[315] JCT estimated that the HIT would raise the cost of premiums up to 2.5 percent and that repealing it would have reduced premiums for the average family by \$350-\$400 in 2016.[316] A temporary moratorium on this tax was extended in ECAA through 2019.[317]

A particularly destructive tax discourages employers from hiring additional workers and providing full-time work. The employer mandate forces employers to provide insurance or face a penalty tax, triggered if even one full-time worker receives an insurance subsidy in the ACA exchanges.[318] Since the tax is generally assessed per full-time worker—redefined by the ACA as someone working 30 hours or more per week—the mandate provides an incentive to cut individual workers' hours.[319] Even if employers do provide insurance, another tax applies if the government determines it is not "affordable."[320] Also, because the mandate applies to companies with 50 or more full-time employees, it discourages small businesses approaching that threshold from hiring additional workers,[321] causing an estimated loss of 250,000 jobs.[322]

An employer offering health insurance that meets the ACA's definition of "affordable" may face yet another tax if the ACA defines the benefits as too generous to employees. The ACA imposes a 40 percent excise tax known as the "Cadillac tax" on the value of health benefits that exceed a certain threshold, including both employer and employee contributions to the plan.[323] The tax is broad, covering not only the value of basic health plans offered by employers but also any pre-tax wellness programs, disease-specific coverage, HRAs, FSAs, and contributions to HSAs by either the employer or employee. Because the threshold that triggers the tax is designed to grow more slowly than costs, a growing percentage of employees will

be subject to the tax over time.[324] The likely result will be fewer benefits, reduced networks for receiving care, and higher costs for employees.[325] Along with temporarily suspending the health insurance tax and medical device tax, ECAA postponed the implementation of the Cadillac tax from 2020 to 2022.

Other ACA taxes aimed at higher-income Americans caused collateral damage for small business owners and employment. The ACA imposed an extra 0.9 percent Medicare payroll tax and a 3.8 percent investment income tax on individuals with incomes over $200,000 ($250,000 for married couples). Like many tax penalties aimed at higher-income Americans, both of these taxes hit small businesses. As mentioned in Chapter 3 of this *Response*, the vast majority of small businesses are organized so that income from the business is taxed on business owners' individual tax returns.[326] An Obama Treasury Department study released shortly after the ACA was enacted found the average gross income of small businesses was $270,000, putting many of them at risk of paying this tax.[327] Chapter 3 also discussed how the investment income tax contributed to the top small business tax rate rising from 35 percent in 2012 to effectively 44.6 percent in 2013. With more small business income consumed by taxes, fewer funds are available to hire workers, give pay raises, and make capital investments to expand the business.

Similarly, the 0.9 percent Medicare surtax affects owners who manage the day-to-day operations of the business and are compensated by the business for their work. CBO listed several ACA policies that contribute to its projection of the law causing a loss of the equivalent of two million full-time employees over the decade, and the Medicare surtax is one of them.[328] CBO also noted the surtax would affect a growing share of workers over time because the tax is not indexed for inflation.

Aside from the possible loss of job opportunities from small businesses, low- and middle-income Americans also face direct tax increases from these two tax hikes. While most of the impact will fall on high-income taxpayers, JCT estimated that people with incomes of less than $75,000 would face a total of $20 million in higher taxes in 2015 alone due to these two ACA taxes, and this includes some taxpayers earning less than $10,000.[329]

Economic Effects of the ACA

CBO recently analyzed factors contributing to the subdued levels of workforce participation by prime-age workers.[330] CBO discussed how effective marginal tax rates—including both higher tax rates and the loss of Federal benefits—affect the willingness to work (Figure 8-2). Average marginal tax rates increased as Fiscal Cliff tax increases (see Chapter 3), the ACA exchanges, Medicaid expansion, and major ACA taxes were implemented. CBO also concluded:

> *...[S]ome provisions of the Affordable Care Act probably discouraged some people from participating in the labor force in the past few years by raising their effective tax rates. The resulting reduction in take-home pay probably had the largest effect on lower-earning workers.[331]*

Figure 8-2

Average Marginal Effective Tax Rates During Obama Administration

Source: CBO

CBO's most recent analysis of marginal effective tax rates faced by low- and middle-income Americans reinforced that those with very low incomes have the greatest fiscal incentive to stay out of the workforce. CBO estimated that in 2016, the income group with the highest potential marginal tax rates included people between 100 and 149 percent of the poverty level.[332] Depending on factors such as family circumstances, those slightly above the poverty level could lose over 65 cents of each additional dollar earned. People in this income range represent the Medicaid expansion population and those who receive the largest insurance subsidies in the ACA exchanges. In essence the ACA discourages those on the edge of climbing out of poverty from seeking employment that would give them greater economic mobility and the dignity of a job.

These are among the reasons why CBO projected in the report mentioned earlier that the ACA will cause the equivalent of two

million full-time workers to leave or stay out of the workforce in 2025.[333]

Other economists have found even more severe economic damage from the ACA. Noted economist Casey Mulligan testified at a 2016 JEC hearing that the combination of ACA tax increases and ACA's benefit structure would reduce aggregate hours worked by almost three percent and national income by two percent.[334]

Mulligan also explained that the ACA had a negative impact on productivity:

> *The Affordable Care Act has several effects on productivity... Households and businesses sacrifice productivity in order to rearrange activities for less of a tax burden. These include excessive part-time work, segregation of low-skill and high-skill employees, constricting large employers in order to expand small ones, and failing to invest as much in business capital.[335]*

Mulligan concluded his testimony with this warning:

> *The bottom line is that helping people who cannot or will not purchase health insurance has a price in terms of labor market inefficiency. The ACA is no exception: it creates new income taxes and full-time employment taxes that will be directly experienced by about half of the workforce and indirectly experienced by essentially the entire nation. As long as incentives to work and earn remain far below what they were eight or nine years ago, we cannot reasonably expect the labor market to return to where it was back then. We cannot expect employment per capita to go back to where it was.[336]*

Questionable Outcomes

The ACA's top-down design—reliant on a complex web of regulations, taxes, and other incentives—is now entrenched in the healthcare system. Yet, in spite of a massive Government takeover of the healthcare system and a Federal command to buy insurance, CBO projected as of December 2017—before Congress removed the individual mandate penalty—that 30 million Americans would still lack health insurance this year.[337]

CEA estimated that at most, the ACA extended coverage to six percent of the population, and much of this through expanded Medicaid enrollment.[338] And as CEA discussed, despite expanded insurance coverage, there is scant evidence that health outcomes improved.[339] In fact, life expectancy in the United States actually declined in 2015 and 2016, the first time in half a century that it dropped for two consecutive years. CEA attributes part of this decline to increased substance abuse.[340]

AMERICA'S OPIOID EPIDEMIC

CEA included a discussion of the opioid epidemic in a section of the *Report* addressing costly diseases that can be prevented, such as obesity and smoking-related illnesses.[341] The JEC Majority agrees that a greater emphasis on prevention and promoting healthy behaviors within the health system could reduce needless costs as well as mitigate human suffering.

As mentioned in Chapter 1 of this *Response*, the JEC has devoted a great deal of study to the opioid epidemic, which the Administration rightly declared a "public health emergency."[342]

The opioid market is expanding in both demand and supply; opioid overdose deaths continue to increase and today are at an unprecedented level (Figure 8-3). Since 2009, total annual drug-poisoning deaths have surpassed automobile deaths; from 1999-

2016, opioid-involved deaths increased five-fold to 42,249.[343] CEA estimates that in 2015 alone, the economic cost of the opioid crisis was more than $500 billion or 2.8 percent of GDP.[344] Opioid overdose deaths fall into three broad categories: prescription drugs, heroin, and synthetics such as fentanyl. From 2000-2011, prescription overdose deaths grew steadily; however, following the 2010 reformulation of heavily abused OxyContin, prescription opioid overdoses leveled off as users switched to greater-potency heroin and fentanyl.[345]

Figure 8-3

Overdose Deaths per 100,000

Drug Overdose Rate   Opioid Overdose Rate

Source: Centers for Disease Control and Prevention

Addiction and overdose deaths, initially fueled by expanded use of legitimate and black-market prescription painkillers, were later exacerbated by an increased supply of potent low-cost Mexican heroin and Chinese fentanyl. As Ohio Attorney General DeWine testified before the Committee, "Four out of five individuals now suffering from heroin or fentanyl addiction first started down this road by using prescription opioids."346 Aggregate measures

reinforce that this is a national crisis, while State death rates vary widely (Figure 8-4).

Figure 8-4

Heroin overdose deaths have been a persistent problem for several counties with dense metropolitan areas for a number of decades. The arrival of new prescription opioids in the late 1990s and their use in the treatment of chronic pain presented a new avenue for opioid misuse. In 1999, prescription opioids were already becoming a problem in a handful of areas around the United States, and by 2015 deaths from prescription opioid overdoses were widespread. Heroin and fentanyl followed suit, with overdose death rates spreading in areas that heavily overlap with prescription overdose deaths.

Synthetic opioid overdose death rates, like those from fentanyl and its derivatives, remain largely concentrated in the eastern United States. Recent research suggests that this might reflect a divide in the type of heroin distributed in the eastern and western United

States. West of the Mississippi River, heroin is largely found in its black tar form, while in the eastern United States, heroin is mostly sold and distributed in white powder form.[347] This makes fentanyl and its derivatives, which are also commonly in white powder form, more easily disguisable as heroin and counterfeit pills in the eastern States.[348]

Prelude to a Crisis: Demand

In 1986, the World Health Organization published *Cancer Pain Relief* and encouraged the use of opioid painkillers. The Food and Drug Administration (FDA) approved a pharmaceutical company's semisynthetic-opioid OxyContin in 1995 for the treatment of moderate-to-severe pain lasting for more than a few days. With an expanded sales force rewarded with large bonuses, the company aggressively marketed OxyContin encouraging physicians—many of whom may not have been trained in pain management—to prescribe it as an initial medication for non-cancer pain. Twice the FDA cited the company for using potentially false and misleading medical journal advertisements.[349] Prescription opioid demand increased rapidly as doctors and dentists prescribed opioid painkillers on an expanded scale.

A 2016 *Time* article entitled "How Obamacare Is Fueling America's Opioid Epidemic" described one way the ACA may have contributed to the crisis.[350] The ACA conditioned a portion of hospitals' funding on patient surveys, including how well they managed patients' pain and even whether the hospital was doing *everything it could* to control pain. Unsurprisingly, this created an incentive for hospitals to overprescribe painkillers. While this policy has thankfully ended, the damage will likely linger for some time to come. Prescription opioids still account for nearly half of all opioid overdose deaths,[351] and though addiction to illicit

opioids like heroin is becoming more prevalent, an estimated 80 percent of people addicted to heroin started by using prescription opioids.[352]

Prescription opioid use has lasting implications for patients. In 2015, physicians prescribed 648.7 morphine milligram equivalents per person in the median U.S. county.[353] That amounts to nearly a two-week supply for every resident. In 2016, nearly 215 million prescriptions for opioids were filled in the United States. Data analyzed by the Centers for Disease Control (CDC) show that 61.8 million patients received those prescriptions, or 19.1 percent of the U.S. population.[354] Of the patients who were prescribed opioids, 3.7 million were ages 19 and under. Forty-one percent of opioid prescriptions were for a supply of 30 days or more. A March 2017 study from the CDC determined that 13.5 percent of patients receiving eight days or more of prescription opioid therapy used opioids one year later—up from 6 percent among patients receiving any prescription opioid therapy.[355] Among patients taking prescription opioids for at least 30 days, 30 percent were using opioids one year later.

Simultaneously, labor market changes have posed significant challenges to workers in certain geographic and occupational segments. The cohort of workers affected the most tends to have a high-school education or less and live in industrial areas concentrated in the Midwest. Princeton University's Professor Sir Angus Deaton's testimony at the Committee's June 2017 hearing, *Economic Aspects of the Opioid Crisis* explained that these workers had a prolonged decline in their economic position. Progressively deteriorating labor-market opportunities have worsened working and personal outcomes, partially contributing to the doubling of "deaths of despair" since 2000.[356] These deaths include suicide, deaths from alcohol liver disease, and accidental overdoses from legal and illegal drugs; they are often the result of

long-term conditions for those currently in their middle age from a "cumulative disadvantage." The largest component of these deaths is opioid overdoses.

The first reports of OxyContin abuse were from rural communities in the Appalachian region (Kentucky, Ohio, Pennsylvania, Virginia, and West Virginia) and Maine. In these areas in 2000, pain patients, teens, and recreational drug users that abused the drug entered drug treatment with physical-addiction symptoms.[357] The Appalachian region's mining, timber, and manufacturing industries are prone to pain-producing injuries and together with a high unemployment rate and low employment-to-population ratio may predispose the region to drug overuse.[358]

Prior to its 2010 abuse-deterrent reformulation, OxyContin was particularly conducive for abuse because its controlled-release property allowed for a high quantity of the opioid active ingredient per pill. Abusers found that in addition to simply swallowing a pill, crushing it bypassed the controlled-release property, intensifying the effect. Abusers' demand for prescription painkillers eventually spilled over to illicit heroin and fentanyl.

Prelude to a Crisis: Supply

The expanding opioid supply is rooted in prescription drugs. OxyContin prescriptions grew from 300,000 in 1996 to more than 7.2 million in 2002; simultaneously annual sales grew from $45 million to $1.5 billion.[359] The expansion of OxyContin prescriptions was partly due to physicians' honest mistakes, which caused some high-school athletes, for example, to become addicted after taking pain medication following sports injuries. Additionally, unethical and criminal conduct by doctors and pharmacies fueled widespread distribution. The rise of "pill mills" where doctors would prescribe large amounts of opioids to anyone increased black-market prescription opioid supply. In many cases,

Medicaid, Medicare Part D, and private insurance paid for prescribed opioids allowing patients low-cost access to a lucrative black market product.[360] *Dreamland: The True Tale of America's Opiate Epidemic*, by Sam Quinones explains how Dr. David Proctor of Portsmouth, Ohio, ran an early pill mill operation, launched others into the business, and spread opioids throughout the Appalachian region that became the epicenter of the opioid crisis. In 2003, Dr. Proctor pled guilty to illegally prescribing controlled substances. Attorney General DeWine testified that, since taking office, he has revoked over 100 doctor and pharmacist licenses from individuals he described as "drug dealers." A number of States and localities have filed a multidistrict litigation againts pharmaceutical manufacturers and distributors to recoup costs associated with the epidemic.

Around 1997, drug traffickers from Mexico began selling black-tar heroin wholesale to New Mexico dealers. In 1998, it crossed the Mississippi and arrived in Columbus, Ohio, compounding the region's opioid problem.[361] Due to the relatively short transportation distance from producer to customer, inexpensive but potent Mexican heroin spread across America. Mexican smugglers and dealers developed a low cost, door-to-door method of delivering heroin. Attorney General DeWine referred to this as a "pizza delivery system" in his testimony:

> *You pick up the phone, you call, and they will deliver it to you. You get it in half an hour, and you are going to get it cheap...*[362]

Fentanyl is even more deadly than heroin; as little as two milligrams can be lethal.[363] According to Congressional Research Service analyst Lisa Sacco's hearing testimony, it is 50 to 100 times more potent than heroin.[364] Licit fentanyl is available in patches and lozenges or can be injectable or sublingual—under the tongue—and can be diverted to black markets. Illicit fentanyl is

often used as a substitute active ingredient in black-market products; frequently the customer is unaware of its presence in the drugs. It is known to be manufactured in China, is suspected to be manufactured in Mexico, and is sold as or mixed with heroin and used in the production of counterfeit prescription pills.[365] National Forensic Laboratory Information System estimated that from 2013-2015 fentanyl reports grew to 14,440 from 978.[366] The National Center for Health Statistics reports that overdose deaths involving synthetic non-methadone opioids (fentanyl, fentanyl analogs, and tramadol) doubled from 2015 to 2016.[367]

Opioid Crisis and the Labor Market

More than a year ago, the *New York Times* published, "Hiring Hurdle: Finding Workers Who Can Pass a Drug Test." Employers across the country are having difficulty finding applicants who can pass a drug test.[368] Attorney General DeWine testified that Ohio employers tell him many applicants either withdraw their application upon discovering they must take a drug test, or they take it and fail. Since the 2009 peak unemployment rate of 10 percent, the rate has trended downward; however, despite the current low rate some aspects of the labor market continue to show weakness. Job openings remain around six million as the prime-age labor force participation rate remains depressed (Figure 8-5). Among the reasons for this divergence may be job applicants' failure to pass drug tests. Drug abuse also hinders worker relocation from less productive positions to more productive positions that generally offer higher wages.[369]

Figure 8-5

Source: Federal Reserve Bank of St. Louis, FRED

Opioid Crisis and Future Generations

An opioid-related addiction, overdose, or death is far from an isolated event. Many lives are affected by the devastation caused by these drugs. Families struggle to keep their loved ones alive through treatments and interventions. Children are affected directly, making this crisis multigenerational.

Reports of young children overwhelming foster care systems are pouring out of States like Ohio, which since 2010 have witnessed an increase of nearly one-fifth in the number of children placed with relatives or in foster care.[370] Between fiscal years 2009 and 2016, the percentage of children nationwide with parental drug use as a factor in out-of-home placement rose from 21.3 percent to 33.7 percent, according to data from the National Data Archive on Child Abuse and Neglect.[371]

Rising rates of neonatal abstinence syndrome (NAS), the diagnosis of a newborn physiologically dependent on drugs or

alcohol that leads to withdrawal symptoms, are generally driven by the opioids that mothers abuse while pregnant.[372] About half of babies who are exposed to opioids during pregnancy will experience NAS.[373]

New England and Appalachia have the highest rates of NAS per 1,000 hospital births. In 2013, according to a CDC study, NAS incidence per 1,000 hospital births was highest in Vermont (33.3) and West Virginia (33.4). In 2012, Maine had a similar level (30.4), but data were not available for 2013.[374]

Increasing numbers of children entering foster care, living with grandparents, or entering the world dependent on opioids will have consequences for decades to come. Many dealing with the childhood trauma of a parent addicted to opioids have suffered severe physical and mental distress, and some researchers speculate that the damage may be behind the recent rise in suicides among children and teenagers.[375]

Economic Costs of the Opioid Crisis

This crisis has been costly to society in many ways. Recent estimates have focused on both the fatal and non-fatal costs. For 2013, CDC researchers estimated that the total economic burden of the crisis was about $78.5 billion.[376] This estimate includes an analysis of the costs derived from health care, substance abuse treatment, criminal justice, and lost productivity.

CEA partially relied on the CDC research to build an even broader cost estimate of the crisis. Using generally accepted methods to estimate the value of a statistical life, CEA estimated that the costs of the crisis due to premature loss of life in 2015 was $431.7 billion.[377] By combining its estimate of the fatality costs with the CDC's estimate, the CEA reported that the total costs of the crisis in 2015 were $504 billion.

Research at the American Enterprise Institute (AEI) relied on both the CDC's and CEA's cost estimates to produce a State-by-State analysis of the cost of the opioid crisis.[378] AEI's estimates use the differential effect of the crisis across States for opioid overdose deaths, opioid abuse disorders, and other costs related to the crisis. To account for variation in population, AEI presents costs by State on a per-capita basis. The analysis shows that non-fatal opioid costs per capita are generally higher in western States and in New England. The highest non-fatal costs per capita are in the District of Columbia ($352 per person) while the lowest are in South Dakota ($162 per person). However, when costs due to loss of life are included, the highest per-capita costs are in Appalachia. West Virginia has the highest per-capita cost by this measure at $4,793 and Nebraska has the lowest at $465 per person.

Possible Solutions

Advances in medical technology may offer solutions for treatment of pain without the need for addictive opioid-based painkillers. For example, devices that emit electronic pulses can interrupt pain signals for patients suffering with chronic pain.[379] Other advances are assisting with controlling the supply of opioids by providing a safe means of deactivating and disposing of unused prescription painkillers.[380]

On a broader economic level, an improved labor market—especially for those who choose not to pursue a college degree—would be beneficial (see Chapter 5 of the *Response*). Also, certain opioid solutions may best be crafted at the community level since aspects of the crisis vary across States and localities. Additionally, CEA outlined several steps the Administration has taken to prevent opioid abuse, improve access to treatment, encourage innovative solutions through research, and disrupt the illicit supply of opioids.[381]

Other solutions will likely come from public and community initiatives. Manhattan Institute's Diana Furchtgott-Roth testified that past massive reeducation campaigns have reduced smoking, decreased littering, and increased recycling; a similar strategy should be applied to opioids beginning in grade school.[382] Representative Darin LaHood explained that drunk driving was reduced in his State through both aggressive law enforcement and campaigns by Mothers Against Drunk Driving (MADD).[383]

INNOVATIVE SOLUTIONS FOR IMPROVING THE HEALTHCARE SYSTEM

Clearly, the health system under its current structure is not serving patients well. Americans deserve more innovative solutions, a point also emphasized by CEA in Chapter 6 of the Report.

Efforts to Repeal and Replace the ACA

In 2017 Congress attempted to repeal and replace the ACA with more market-driven reforms. The House of Representatives succeeded in passing the *American Health Care Act* (AHCA).[384]

AHCA offered States greater flexibility and control over their insurance markets, and CBO estimated that if AHCA became law, average premiums within a decade would be 30 percent lower in certain states that make modest changes, 20 percent lower on average across all states that make changes, and four percent lower in States that made no changes.[385]

CBO also projected that AHCA would reduce mandatory spending by $1.1 trillion, provide nearly $1 trillion in tax relief by repealing ACA taxes, and reduce deficits by $119 billion over the decade.[386]

In addition to maintaining protections for people with pre-existing conditions, AHCA aimed to reduce the price and increase the quality of health care for consumers. To stabilize State insurance markets, it provided a $138 billion Patient and State Stability Fund

to lower costs and provide better access for patients. The fund also dedicated $15 billion for State-run invisible risk pools (with subsidies for high-cost enrollees who remain within a general insurance pool in the individual market) and an additional $8 billion for high-risk pools (separate insurance pools of high-cost individuals). Additionally, the fund included $15 billion targeted for treating addiction and serious mental illness, as well as for maternity and newborn care.

AHCA also reformed ACA's age band restrictions that have made insurance unaffordable for young and healthy enrollees that are needed to keep insurance costs down for everyone in the insurance pool. At the same time, AHCA provided tax credits for buying insurance that increase with age.

Other AHCA reforms included improved and expanded HSAs as well as repeal of ACA taxes, including those that make health care less affordable. To provide more State flexibility and insurance options for patients, AHCA included a waiver process allowing States to design their own package of "essential health benefits" that insurers must cover—rather than a one-size-fits-all Federal list—so their residents are not forced to pay for coverage they do not want and will never use.[387]

The Senate was unable to pass its own repeal and replacement legislation, but the JEC Majority recommends that Congress continue to pursue replacement reforms that will reduce the economic burden and provide consumers with lower costs and more choices.

Progress on Repairing Economic Damage

In addition to actions by Congress to repeal the harmful individual mandate tax and delay other ACA tax increases, the current Administration has taken several steps on its own to provide States

with more flexibility, address harmful disincentives to work, and allow consumers to have more insurance options.

Allowing work incentives within Medicaid. In January 2018 the Administration announced a new Medicaid waiver process so that States could require able-bodied enrollees to engage in work, education and training, or other community engagement such as volunteer service. The announcement cited evidence that higher earnings are associated with a longer lifespan and that unemployed persons are more likely to suffer from severe physical and mental health challenges.[388] As noted earlier, the work disincentives of the ACA are particularly severe for those on the edge of poverty— the Medicaid population. Providing an incentive to work may lead to greater future prosperity and better health outcomes for enrollees. The program is voluntary with required protections for enrollees and will provide a useful experiment to determine whether more Americans can be moved out of poverty with incentives to work.

Greater access to Association Health Plans. The current Administration is also improving small business access to affordable health coverage by expanding Association Health Plans (AHPs). AHPs allow small businesses to join together and form a single insurance pool, which provides them with greater purchasing power and lower costs. The Department of Labor estimates that the proposal would benefit up to 11 million Americans who are working in small businesses or are sole proprietors.[389]

The same proposal rule would allow insurance to be purchased across State lines, injecting greater competition in the market, while providing relief from some of the ACA's more onerous requirements about the design of insurance. However, insurers participating in AHPs could not discriminate against enrollees or employers based on health factors.

<u>Expanded short-term coverage</u>. On February 20, 2018, the Administration announced that it would expand the duration of short-term insurance plans used to fill gaps in health coverage from less than three months to less than a year. These plans are generally available for less than a third of the cost of other ACA individual market plans and allow consumers to choose the types of coverage they prefer instead of imposing a one-size-fits-all design.[390]

Chronic Care Management

According to the CDC, chronic diseases are the leading cause of death and disability in the United States and were responsible for 86 percent of the $2.7 trillion spent on health care in 2014.[391] The CDC also cites research findings that chronic conditions have a significant impact on worker productivity. For example, from 2012 to 2013 cardiovascular disease cost $126.4 billion in lost productivity through premature death. In 2012 diabetes reduced productivity by $69 billion due to absenteeism and by causing workers to be less productive on the job. From 2009 to 2012, smoking-related diseases cost over $156 billion in lost productivity.[392]

Thus, a health system that incentivizes better management and prevention of chronic diseases would prevent needless human, monetary, and economic costs.

Much of the health system is designed on a fee-for-service model. That is, providers are reimbursed based on the volume of visits, treatments, and procedures rather than the health outcomes of patients. In the Medicare program—which serves Americans age 65 and older as well as those unable to work due to a disability—patients with multiple chronic conditions are responsible for 93 percent of Medicare costs, and a system that rewards volume over quality does not serve them well.[393]

In 2016, JEC Chairman Paulsen joined with Rep. Peter Welch in introducing the bipartisan *Better Care, Lower Cost Act* to provide more coordinated care, better health outcomes, and lower costs for Medicare patients with multiple chronic conditions.[394] By providing a flat payment to a group of providers and rewarding the coordinated group for keeping a patient healthy, the legislation would promote—as the name suggests—better care at a lower cost.

A structure in which providers have some "skin in the game" is vastly superior to the Accountable Care Organizations (ACOs) that were created through the ACA. As CEA discussed, ACOs were intended to help curb costs but had the opposite result. ACOs received "shared savings" through Medicare if they provided efficient care but bore little downside risk if the care became costly. Rather than reducing Medicare costs, ACOs increased Medicare spending by $216 million in 2015 and $39 million in 2016, according to a study cited by CEA.[395]

The JEC Majority recommends that Congress consider the *Better Care, Lower Cost Act* and other approaches that reward quality outcomes rather than expensive care.

The Promise of Medical Technology

Advances in medical technology also hold great promise for treating patients with chronic conditions, both in saving and improving lives and preventing lost productivity. For example, insulin pumps allow patients with Type I diabetes to better manage their disease. Implanted pacemakers and defibrillators can prevent death for people with cardiovascular disease. Also, orthopedic devices allow patients to perform better at work and in their private lives.

That is why the JEC Majority continues to advocate full repeal of the medical device tax, which is making breakthroughs like these less likely in the future. The U.S. also generally experiences trade surpluses with medical technology products, which helps boost GDP.[396]

As CEA noted, the fact that the new tax law allows expensing of capital investments is likely to encourage further innovation in the healthcare field.[397] The Administration has also streamlined the FDA approval process for new therapies. CEA indicated that in 2017 this resulted in the first-ever gene therapies as well as record numbers of approved new medical devices, new drugs and biologics, and generic drugs.[398]

Another technological innovation that could provide patients with better and more efficient care is greater coordination and portability of medical records. The 2016 Better Way framework for reforming health care called for policies to promote innovation in electronic medical records.[399] These included reforming unnecessary restrictions while protecting patient privacy. The plan envisions records that would be portable for patients, freeing them from paperwork burdens each time they see a new provider and preventing medical errors that occur because of incomplete information about the patient's medical history.

Blockchain technology, discussed more fully in Chapter 9 of this *Response*, could provide a powerful solution for portability, enabling medical records to be carried on a smartphone or other mobile device with very little risk of being vulnerable to cyberattacks.

CEA devoted a great deal of discussion to pharmaceuticals and their affordability. As mentioned earlier, repealing the ACA's tax on brand-name drugs would likely reduce prices for patients, since this is the type of tax generally passed to consumers.

Other nations impose price controls on prescription drugs, a practice that the JEC Majority strongly cautions against. The freer market in the United States is one of the reasons that pharmaceutical innovation has flocked to the United States. As CEA described it, America is "the engine of worldwide pharmaceutical innovation, accounting for an estimated 46 percent of OECD patented pharmaceutical sales."[400]

The JEC Majority also agrees that reforming Government-imposed regulatory burdens and eliminating other artificial barriers that create unnecessary costs are part of the solution. As CEA noted, the more efficient FDA approval process is an example of one of those reforms.[401]

The JEC Majority looks forward to seeing more details on Administration proposals for lowering prescription drug costs and injecting more price competition in the health system. Congress and the Administration have a shared goal of ensuring that Americans have access to the best medical innovations in the world.[402]

CONCLUSION

The ACA has damaged the economy and left patients with higher costs, fewer choices, and questionable health outcomes. While Congress and the Administration have made some progress in addressing harmful aspects of the ACA, more should be done to provide greater competition and choices within insurance markets, lower costs, and higher quality.

Recommendations

In order to provide more innovative solutions for challenges within the healthcare system, the JEC Majority recommends:

➢ Continuation of ACA replacement efforts that reduce work disincentives, lower costs, expand choices, and repeal harmful ACA taxes;

➢ A national focus on combatting the opioid epidemic, including through better prevention via an education campaign, treatment of pain without addictive painkillers, community-oriented solutions for those already addicted, and greater disruption of supply.

➢ Greater emphasis on preventing and coordinating treatment for chronic conditions, with a focus on rewarding quality outcomes instead of costly care; and

➢ Expanded access to medical technology that could revolutionize health care, including through (1) repeal of the medical device tax, (2) coordination and portability of medical records, and (3) reform of regulatory burdens that delay innovation or make products more costly.

CHAPTER 9: BUILDING A SECURE FUTURE, ONE BLOCKCHAIN AT A TIME

- The *Report* estimates the substantial direct costs and longer-term indirect loss incurred to the economy and critical infrastructure from cyberattacks and threats. The *Report* suggests blockchain as a potential tool for securing America's digital infrastructure.

- Blockchain technology—providing cybersecurity and many other potential benefits—broke into the mainstream in 2017 driven by widespread interest and surging valuations in digital currencies such as Bitcoin and Ethereum.

- These new innovations and markets presented America's regulatory and legislative institutions with unique challenges as well as technology that could revolutionize the world's digital landscape and economy.

INTRODUCTION

The *Report* reviews the new digital threats facing America today. Ensuring the security of computers, the internet, networks, and infrastructure is an enormous task, and the *Report* estimates the costs incurred from cyberattacks. As methods of theft, espionage, and vandalism shift from physical toward virtual—including data and intellectual property—law enforcement's role in fighting property crime remains vital. The economy benefits from protecting private property and contract integrity.

This chapter of the *Response* discusses a particular technology—blockchain—that is not only nearly invulnerable to cyberattack but

is revolutionizing the way the world conducts commerce and shares information.

THE YEAR OF CRYPTOCURRENCIES

Many significant economic events stand out in 2017—passage of tax reform, regulatory reform, the continued drop in unemployment and the emergence of cryptocurrencies should be listed among them. Sensational headlines and intense fascination drove "Bitcoin" to second place as a global news topic in Google's Year in Search 2017.[403] As shown in Figure 9-1, "Bitcoin" searches skyrocketed, and "blockchain" and "Ethereum" moved out of relative obscurity.

Figure 9-1

In addition to the surge in searches, the price of many cryptocurrency and blockchain assets skyrocketed. The Dow Jones Industrial Average (DJIA) started 2017 over 19,881 points and grew 24 percent to 24,719; the S&P 500 grew by more than

17 percent.[404] Yet, while both stock market measures experienced strong growth, cryptocurrencies dwarfed their performance.

Bitcoin started 2017 at a price just under $1,000 per bitcoin and finished well over $12,500 per bitcoin, an appreciation of over 1,100 percent. During that period, Bitcoin topped out over $19,000 per bitcoin. The second largest cryptocurrency, Ethereum, did even better. At the beginning of 2017, ether (Ethereum's currency) was worth under $10. By the end of 2017, ether shot up to over $719, an astronomical appreciation of 6,713 percent.[405] Stock market gains seem meager in comparison (Figure 8-2).

The buzz surrounding digital currencies resembles the internet excitement in the late 1990s when people recognized technology companies could change the world. Many internet companies launched and their valuations took off in short order. Many failed, but a few succeeded spectacularly and challenged the conventional ways of doing business. For example, people considered GeoCities the "home page" for individuals and Yahoo bought the company for $3.57 billion in 1999.[406] GeoCities had characteristics similar to Facebook today (or MySpace in the early 2000s), but it never came close to Facebook's reach and remained unprofitable. A company that did eventually succeed is an online book retailer called Amazon.com, but along the way its price gyrated with stock splits and recessions.[407]

Figure 9-2

Cryptocurrencies made stock market gains look insignificant

Source: CoinDesk, St. Louis Federal Reserve, DJIA Stands for "Dow Jones Industrial Average"

Surging prices also drove up cryptocurrency market capitalization. At the beginning of 2017, the total value of all bitcoin in circulation was almost $15.5 billion, but by year's end it increased almost 14-fold to over $216 billion. Other cryptocurrencies such as Ethereum, Ripple, and Litecoin experienced similar gains. Ether's total circulating value multiplied by 98 from just under $700 million to over $68 billion. Ripple's market cap multiplied by an even larger 342 from $237 million to over $81 billion. Finally, Litecoin lost its position as the third-largest cryptocurrency in 2017. It still grew robustly but increased to just 55 times its original market cap of over $212 million, to well over $11 billion.[408]

Figure 9-3

Cryptocurrencies hit a growth spurt

Coin Market Cap from January 1, 2017 to December 31, 2017

Source: Coinmarketcap.com

WHAT ARE CRYPTOCURRENCIES AND BLOCKCHAIN?

Blockchain is the distributed ledger technology that underlies digital currencies such as Bitcoin. A ledger is the accounting tool that tracks the movement of money from one person or account to another. Conventionally, such records are stored in central locations like banks, headquarters, and Paypal servers. Blockchain revolutionizes ledger technology with a network of distributed ledgers. Instead of one central, authoritative record of all transactions or information, blockchain creates potentially thousands of identical ledgers in computers and servers all over the world.

In "permissionless" proof-of-work blockchain, people compete to validate each transaction in return for a reward. The protocol rewards users for creating and validating entries into the ledger. This reward creates an incentive for competition and gives these validators ("miners" see Box 9-1) new tokens to use in the system. Users who do not earn tokens by performing verifications, i.e., not

"miners," must buy the tokens. This interplay between miners and purchasers create an ecosystem where people have clear incentives and rewards to maintain the distributed ledger for everyone.[409]

Bitcoin was the first blockchain. Bitcoin's network creates a new record of verified transactions approximately every ten minutes and packages the records into a so-called "block". Ethereum is the second-largest cryptocurrency in the world, and though it uses the same blockchain technology as Bitcoin, it serves different purposes. While Bitcoin's blockchain records each transaction in its currency, Ethereum records results from the programs users upload to its network. It allows programmers to create applications and "smart contracts" that utilize computing power from Ethereum's network to execute them.[410] This brings the decentralized security of blockchain to computing power, while allowing developers to build applications, smart contracts, and other digital coins on top of Ethereum. Additionally, it uses the same proof-of-work mining that Bitcoin does, but its network produces a block every 12 to 15 seconds and rewards its miners three ethers per block, with additional rewards for solutions found but not included.[411]

Box 9-1: Bitcoin Mining (Proof-of-Work)

Each block contains data related to Bitcoins sent and received, as well as digital signatures using cryptographic keys, by which each party confirms its agreement to a transaction. Each block is chained to the previous block, as computers throughout the network confirm its validity and solve a complex cryptographic proof. Solving this proof requires immense energy consumption, deterring other computers from spamming the Bitcoin network.[412] Once a block is in the chain, it can never be removed or altered and will be there for everyone on the network to see. The protocol then begins working on the next block in the chain.

The process is called mining using a proof-of-work method.[413] Essentially, users on the network have to prove that they constructed a block and solved the cryptographic proof. The Bitcoin protocol adjusts the difficulty of the proof to ensure a new block approximately every ten minutes. The users who successfully mine a new block are allowed to reward themselves with new bitcoins. The rewards dwindle based on the number of blocks in the chain. Thus, the only revenue miners can earn will come from the transaction fees.[414] The mining process varies among cryptocurrencies.

Are Digital Currencies Actual Currencies?

Blockchain technology could compete with existing mechanisms, goods, and services. Its initial application as a payment medium prompted questions about whether it might replace national currencies and challenge the U.S. dollar. While skyrocketing cryptocurrency prices impress, economists question whether these new digital technologies should be considered currencies. Currencies serve three functions: medium of exchange, unit of account, and store of value. A medium of exchange is something people willingly accept for goods and services. People willingly accept the medium of exchange because they believe it can be used for other transactions. A unit of account is a measure people use to post prices. A currency provides a common measurement unit of pricing, enabling direct comparisons across different products or services. Finally, a store of value is something that individuals can use to transfer purchasing power over time. A currency will not be the only store of value in an economy. Many items can potentially store value, but money normally maintains relatively stable purchasing power over time and individuals expect it to remain an acceptable medium of exchange in the future.[415]

At this point, many prominent economists do not believe cryptocurrencies fit the standard definition of money. Former Federal Reserve Chair Janet Yellen considered Bitcoin a "highly speculative asset" that is not considered legal tender.[416] Bitcoin itself has technical and economic limitations that hinder its use as a medium of exchange. Transaction processing time and fees on the Bitcoin network keep increasing and render Bitcoin uneconomical for common purchases. According to one report, Bitcoin transaction fees averaged $28 in December 2017 and processing time reached an average of 19.8 hours.[417] This was at the height of Bitcoin's popularity in 2017 and highlighted the limitations of its underlying protocol. Bitcoin's current design can only process about seven transactions per second, while Visa or Mastercard can process thousands. The debate over scalability deeply divides the Bitcoin community. Ethereum experienced similar problems, but underwent a planned and substantial upgrade in October of 2017 that improved its processing time.[418] If Bitcoin or other digital currencies can improve their underlying protocols or find off- chain solutions, they could speed up processing time and reduce transaction fees.

Extreme volatility in the dollar price of cryptocurrencies also impairs their use as money because people price goods and services in dollars and thus their purchasing power fluctuates wildly. For example, the price of pizza could move from a fraction of a bitcoin to thousands of them in a short time.[419] In order to value items in terms of bitcoin, ether, or ripple, the dollar exchange values of these units would have to stabilize. The dollar loses about two percent of its value per year due to inflation, but its purchasing power loss is modest and predictable so people can incorporate it in their decisions. If digital currencies become less volatile in the future, valuing items in those denominations could become easier and individuals might begin using them more frequently as a medium of exchange.

Some critics of currencies controlled by government fiat welcome cryptocurrencies because their supply is preprogrammed and perceived as unchangeable.[420] For example, only 21 million bitcoins will ever be issued and the last fraction of a bitcoin will be issued in approximately 2140.[421] Additionally, the creator of Ethereum designed its mining reward to decline exponentially as more miners create blocks, and according to his calculations the supply will be just over 100 million ether.[422] The volatility of digital currency values has not resulted from variability of their supply,[423] as was the case with the Venezuelan bolivar, which lost essentially all its value in less than a year;[424] rather, the value fluctuations of digital currencies stem from the demand side.

In 2017, demand for these assets spiked, leading to the significant price appreciation. Whether digital currencies hold their value will depend upon whether they offer benefits in terms of ease of use and accessibility, low transaction costs, security, anonymity, and other considerations in sufficient degree relative to conventional currencies and other stores of value such as gold. Venezuelans bought Bitcoin in increasing amounts recently, presumably because their national currency lost value and the government imposed capital controls. In this sense, cryptocurrencies resemble real assets or commodities more than currencies, though their future role could expand to include functioning as mediums of exchange.

Initial Coin Offerings

A new market formed around blockchain startups, called Initial Coin Offerings (ICO). An ICO allows developers to raise funds for a project by issuing tokens to use on that project. For example, if a group of economists wants to exchange papers, research, analysis, and review or editing services, developers would create an online platform to allow each person to have an account for

conducting these activities. Before blockchain, such a site would usually use outside payment systems such as Paypal or Visa to process transactions, but in this example, users could transact with hypothetical scarce tokens called EconoCoins.[425]

The second element would be a "smart contract." While smart contracts might sound new, the concept is rooted in basic contract law. Usually the judicial system adjudicates contractual disputes and enforces terms, but it is also common to have another arbitration method, especially for international transactions. With smart contracts, a program enforces the contract built into the code. Using the EconoCoin example above, if economist A wants economist B to edit her paper, economist B agrees and both create a smart contract that will reward economist B with EconoCoins from economist A's wallet upon delivery of edits. The network will enforce the contract without a third party, but the two economists can also build in a provision that would enlist others in the network to resolve disputes for a fee.

The developers and economists in this example do not need an influx of outside capital to begin the project. With an ICO, the creators explain the concept to potential users and offer for purchase initial coins that can be used in the network. Platform users would utilize the coins on the network to obtain the services or goods listed above.

An ICO consolidates two important elements of building a new economic ecosystem, obtaining funding and creating a network. ICOs do not offer equity and are much less expensive than an Initial Public Offering (IPO). PricewaterhouseCoopers estimated that an IPO costs companies between four to seven percent of the capital raised and an additional $4.2 million in accounting costs. Further, after surveying chief financial officers, PricewaterhouseCoopers found that companies spend between $1 million and $2 million annually on maintaining their status as a

publicly listed entity.[426] These costs help explain why only the largest of companies go public.

In contrast, developer Merunas Grincalaitis estimated that an ICO would take three months and cost approximately $60,000. A third of this cost comes from legal fees to ensure the ICO complies with relevant laws.[427] Once up and running, these platforms continue to raise funding for upgrades and maintenance through either transaction fees for verification, appreciation of the tokens, or donations. During 2017, developers launched hundreds of ICOs and investors realized their potential. Most new tokens utilized the Ethereum blockchain to launch their tokens and execute their code.

As shown in Figure 9-4 below, the enthusiasm led to an explosion in capital flowing into the ICO market. Before 2017, developers raised just under $300 million in funding for ICO projects. Although this number may seem high, it is misleading. Approximately $152 million of these funds went into the infamous Decentralized Autonomous Organization (DAO) which eventually shut down and returned a portion of those funds (more details below). During 2017, developers raised over $5.3 billion for new token companies. Such capital includes a plethora of projects and ideas. For example, FileCoin, a blockchain intended to decentralize cloud storage away from Amazon and Google, raised $262 million to move forward with its vision. Many of these projects will likely fail, as most startups do, but the ones that do survive could transform the way the internet and technology works for decades to come.

Figure 9-4

Capital Raised through ICOs exploded in 2017

Blockchain Innovations

Cryptocurrencies and ICOs create headlines, and the pace of financial innovation in the blockchain space amazes skeptics. Yet, with all the headlines focusing on the financial applications, people may miss the digital revolution now happening with other blockchain applications. Even worse, people could be frightened about new developments with the technology as they associate blockchains with the negative headlines. Blockchain technology offers a decentralized, secure, and efficient way to store almost any form of data across multiple platforms. Developers, companies, and governments recognize the potential and have already starting to implement blockchains for many different uses.

For instance, health care providers, patients, and policymakers continue searching for portable and secure ways to store medical records digitally. On a Joint Economic Committee podcast, Committee member Representative David Schweikert described

how health care companies are already researching blockchains as a secure way to keep medical records on personal smartphones or within provider networks, and what this advance could mean for America's future:[428]

> [M]edical records have no value if they don't move with you. So think of if I could put my medical records on a blockchain where just like on many phones, I could use my thumbprint and a password and with a certain type of encryption…It would be HIPAA [Health Insurance Portability and Accountability Act, which includes patient privacy protections] compliant. Now all of a sudden you and I and the rest of society can carry their medical records on their phone.[429]

Unlike many innovations that attempt to skirt laws or regulations and become associated with the underground, these new blockchain products attempt to comply with the current system and even work together with regulators. The new products range from coordinating payment (healthnexus),[430] monitoring and rewarding patients for following clinical recommendations (RoboMed Network),[431] tracking pharmaceuticals along the supply chain (MediLedger),[432] and even identifying specific supply chain problems such as those associated with the opioid crisis (BlockMedx).[433]

On the regulatory side, Representative Schweikert currently coordinates with institutions like the Massachusetts Institute of Technology and the National Institute of Standards and Technology (NIST) to develop encryption standards that would protect Americans' private medical data.[434] Further, in 2016 the United States Department of Health and Human Services (HHS) announced the "Use of Blockchain in Health IT and Health-Related Research" Ideation Challenge.[435] The initiative requested

white papers examining how blockchain technology could change health information technology. Researchers submitted 77 papers and 15 won awards from their work.[436]

From applications ranging from management of the electrical grid and utilities to how companies manage global supply chains, the potential for blockchain is truly revolutionary. For example, power plants could record the electricity they generates on a blockchain as available for purchase. Utilities could then purchase the power, and the blockchain would record the purchase and the transfer. Finally, the meters of end users would communicate with the utility to purchase portions of the power. These steps occur now but using a distributed ledger would streamline and speed up delivery, lowering costs and saving power.

Blockchains could also enable microgrids from local power sources. The company LO3 Energy currently runs a pilot program for trading power from solar panels on Brooklyn roofs. Smart meters throughout the neighborhood would buy and sell power generated from these alternative sources as it enters the grid.[437] With these developments and countless possibilities, it is no surprise that governments around the world started working with energy providers to explore blockchain's use.[438] Even the Department of Energy partnered with BlockCypher to demonstrate how blockchains could facilitate a smarter energy grid.[439]

Shipping a product from a supplier to retail creates mountains of paperwork or computer records that are rarely compatible across differing systems, especially a when distributor acts as a middle-man between the two. The paperwork and data tracking multiplies when sending said product overseas or importing. Not only will multiple parties need to ship the product, but the supplier and customer will have to deal with customs agency paper work. Recognizing blockchain's potential, IBM teamed up with the

world's largest shipping company, Maersk, to develop a consensus distributed ledger that would allow all companies and government agencies along the chain to record, track, and verify products throughout their journey.[440]

Walmart and other grocers started testing blockchains for their supply chains. In testimony before the House Science and Technology Committee, Frank Yiannas, Walmart's Vice President of Food Safety, described how tracking E. coli and other contaminated food took companies and regulators weeks, which left Americans at risk and incurring large costs in food waste. Walmart tested a blockchain platform to track sliced mangos from farm to shelves and reduced the tracking time from 7 days to 2.2 seconds. Walmart and ten of the largest grocers in America formed a coalition to implement this technology throughout their supply chains.[441]

Growing Pains and Misuses

The potential for theft remains a problem but not due to the structure of blockchain. No evidence exists of anyone hacking blockchain's underlying protocol, but digital currencies are still vulnerable to theft. Users keep their currencies on digital "wallets" stored as files on a computer. For many, this could be a technical barrier deterring them from directly using the tokens. Centralized exchanges and internet services emerged to solve this hurdle where users could buy, sell, and store their virtual currency on that site. The most well-known American example is the site Coinbase. However, using an exchange to store ones' digital assets increases the risk of theft. When individuals keep their digital asset in a single "wallet," the only way to access it is by knowing their private key. But with online exchanges that pool multiple assets into much larger "wallets" to facilitate trading, many people will have access to those funds.

Although Coinbase and other exchanges earned reputations for security, a few early exchanges did not. The most infamous theft occurred on the Mt. Gox exchange. This early Japanese exchange allowed users to create accounts and store Bitcoin. In 2014, bad actors gained access to Mt. Gox's main wallet and transferred hundreds of millions of dollars' worth of Bitcoin to their account. Mt. Gox's system was so flawed that a user accidently entered a negative symbol under payment and the site credited him with extra bitcoin. After multiple thefts and the arrest of the owner, the site was shut down.[442] Users in a cryptocurrency exchange must remember that they are putting their trust in the security of that entity in a manner similar to depositors in early banks.

In July 2017, YouGov polled internet users about what they believed people mainly used cryptocurrencies to do. While just under 40 percent said they did not know, almost a quarter said these currencies were used for illegal transactions. Anecdotal reports furthered this sentiment as sites such as Silk Road, an online marketplace for illicit drugs, publicized Bitcoin's use for the transactions.[443] Recently economists estimated that approximately 25 percent of all users conduct illegal transactions on Bitcoin, and while the proportion of transactions for illegal purposes fell, the absolute level remained at an all-time high in April 2017.[444]

The rapid appreciation in value of cryptocurrencies and ICOs contributed to the doubt and unease about blockchain technology. *The New Palgrave Dictionary of Economics* defines price bubbles as "asset prices that exceed an asset's fundamental value because current owners believe they can resell the asset at an even higher price."[445] Nobel Prize Winners Eugene Fama and Robert Shiller disagree on the reasons for an asset's value.[446] The former maintains that markets always set efficient prices based on the information available. The latter claims that, at times, irrational

decisions can determine prices. With new kinds of investments, detailed information about the product will likely be hard to find or could be manipulated. This makes establishing the fundamental value difficult. Investors will estimate the possible future value, but with only unreliable and changing information to go on, their valuations fluctuate. Market participants will rationally speculate to varying degrees and the price reflects the "best guess" of future value. Still, Robert Shiller would note that "irrational exuberance" could take hold and drive up asset prices beyond reasonable estimations of fundamental value, which eventually leads to a rapid downward correction. "Bubble" sceptics will point out that no one can identify bubbles *a priori* with any consistency.[447]

Blockchain's market reception fits the pattern of a new, not fully understood technology. Within the financial community, it is a running joke that adding "blockchain" to a company's name, prospectus, or business plan will drive up the stock price. A recent example of this phenomenon is the unprofitable New York-based Long Island Iced Tea Corporation, which specialized in selling non-alcoholic beverages. With the NASDAQ threatening to delist the publicly traded company, it changed the name to Long Blockchain Corporation.[448] As Figure 9-5 shows, the stock price skyrocketed after the announcement and closed at a price three times the higher value.

Figure 9-5

Outside what may seem an obvious attempt at cash grabs, observers will point to other warning signs such as Useless Ethereum Token (UET) and DogeCoin. The creator of UET advertised the coin with the following: "The UET ICO transparently offers no value" and "Might be secure, definitely not audited."[449] The ICO still raised $336,038 and issued almost 4 million tokens. DogeCoin's recent rise raises similar concerns. In 2013, Jackson Palmer created a "joke" cryptocurrency called DogeCoin as a parody of many alternative currencies started at that time and to raise awareness about cryptocurrencies generally. A year later, scammers fleeced millions from the DogeCoin community, and users including Jackson Palmer left as enthusiasm and good will evaporated.[450] Prior to 2017, the highest market capitalization was just over $89 million in February of 2014. As enthusiasm grew, DogeCoin expanded to almost $2 billion in market capitalization.[451]

REGULATORY QUESTIONS

Cryptocurrencies, ICOs, and their exchanges present novel regulatory challenges. Their rapid ascension led to instances of

new products running afoul of America's current regulatory framework. This demonstrated how certain regulatory environments are simply out of touch with the internet age. The market expanded with a light regulatory touch, but its explosion in 2017 and the well-publicized nefarious actions in this space prompted regulators to act. Further, American regulators spent years convening working groups, watching developments, and conducting research to ensure they understood how these technologies operated and how they could be regulated. Rather than covering the plethora of regulatory challenges cryptocurrencies and blockchain present, this *Response* will focus on securities regulations, money transmission laws, taxation definitions, and possible future regulatory action.

Securities Regulation

ICOs developed so rapidly, as shown in the above in Figure 9-4, that many innovators did not ask the question, "Is this a security that would need to be registered with the Securities and Exchange Commission (SEC) or other regulators?" The most well-known example is Ethereum's Decentralized Autonomous Organization (DAO). The DAO was a digital organization that allowed users to contribute ether to a pool that would be invested in proposed projects based on a vote. The amount contributed would determine how many votes a user had. The DAO launched its tokens on Ethereum's blockchain as an open source program in May 2016 and attracted 14 percent of all ether created at that point.[452] Within a month, someone exploited a flaw in the code and stole over $50 million in ether.[453] This caused Ethereum's value to drop and eventually led to shutting down the DAO and a splitting of the currency to return the ether to its original owners before the DAO.[454]

The DAO represented amazing innovation in democratized finance, but its operation certainly seemed as if it were similar to a mutual or hedge fund. If so, then it should have registered as a security with the SEC. The SEC launched an investigation into the DAO to determine if it should have been defined as a security subject to SEC regulation. The normal test for this purpose is considered the Howey Test, named for a case the SEC brought against a 1946 orange grove.[455] Peter Van Valkenburgh summarizes the test as four prongs:

> *A [security] for the purposes of the Securities Act means a contract, transaction or scheme whereby a person...*
>
> - *invests his money in*
> - *a common enterprise and is led to*
> - *expect profits*
> - *solely from the efforts of the promoter or a third party*[456]

The SEC found the DAO should have been defined as a security under this test.[457] Since this ruling, the SEC started pursuing more enforcement actions against new tokens for both securities registration issues[458] and fraud.[459] Additionally, SEC Chairman Clayton started warning against unregistered securities offerings, fraud, and pursuit of superficial name changes such as the one undertaken by Long Island Iced Tea.[460]

Market innovators knew securities regulators would scrutinize both the potential fraud and securities registration. A group of participants joined in brainstorming an industry standard for future token launches.[461] The agreement they launched was called the Simple Agreement for Future Tokens (SAFT).[462] The SAFT acknowledges that presale tokens before a network operates should be considered a security available for accredited investors.

Once the network is running, the tokens would be available to the public as utility tokens and not classified as securities. Using the EconoCoin example, the token sales to raise funds for the project would be considered a security. Once the project was up and running, those tokens would then be available to the public and not a security. SEC Chairman Clayton has yet to comment on the SAFT proposal, but it exemplifies the good actors within a market working to root out fraud and ensure that new innovations comply with existing regulations.

Taxation

Securities regulations are not the only federal rules challenged by the innovation of cryptocurrencies challenge. Bitcoin's rise introduced an ever-growing question about how these assets should be taxed. For example, dollar fluctuations are not taxed. If a person held cash for a number of years and the purchasing power went up relative to other currencies, the appreciation would not be considered taxable if the dollar is later exchanged for foreign currency. However, the tax code treats foreign currency as property rather than currency.

If foreign currency is received as part of a business transaction, it is considered ordinary income and must be reported as a dollar value at the time it is received. If the currency then appreciates before the foreign currency is actually exchanged for dollars, the appreciation is treated as a capital gain and subject to capital gains taxes. If the taxpayer is an individual and not a business and holds foreign currency for an investment, the gains when the currency is converted to dollars are considered capital gains. However, if an individual is not holding foreign currency as part of a business or an investment—as often occurs in foreign travel—then up to $200 in appreciation is exempt from taxes and any additional amount is capital gain.

This distinction made participants wonder if cryptocurrencies receive the same treatment. In 2014, the IRS recognized the need for clarity and issued a guidance document to answer frequently asked questions and request further comments on the issue. Like foreign currency, the IRS classified virtual currencies as property and not currency, but noted they should not be considered foreign currency for tax purposes. Similar to foreign currency, taxpayers who receive digital currency as payment for goods and services must treat it as ordinary income and report the fair market value in dollars, and any appreciation after that point as capital gain when exchanged for dollars. Additionally, taxpayers who hold virtual currency as an investment must treat appreciation like capital gain. However, the $200 exemption that applies to personal foreign currency transactions does not appear to apply to virtual currency. Hypothetically, if a person paid a coffee shop for a cup of espresso with a virtual currency, that person would need to track the basis and fair market value of each small transaction like this to determine gain or loss in the virtual currency. Additionally, the IRS clarified that mining awards should be included in users' gross income.[463]

While the guidance provided some clarity, it left many unanswered questions that prompted comments requesting clarification. For example, the American Institute for Certified Public Accountants (AICPA) noted that while the IRS indicated fair market value could be obtained from exchanges, it did not specify which exchanges should be used. Further, AICPA pointed out that tracking basis and fair market value in very small transactions would create an enormous compliance burden for users without significantly affecting the total gain or loss in virtual currencies.[464] The IRS has agreed to better coordinate virtual currency.[465]

The larger issue for virtual currency market participants is that the absence of guidance could expose them to enforcement actions later if rules are applied retroactively. Such a situation could freeze investment and exploration into new virtual currencies, especially for smaller transactions such as coffee purchases. Representative Schweikert, along with Colorado Representative Jared Polis, introduced the Cryptocurrency Tax Fairness Act of 2017.[466] The bill would essentially create a *de minimis* reporting exemption for virtual currency purchases under $600.[467] The bill has yet to become law, but as virtual currencies' popularity and technical abilities improve, more bills on this topic will likely be introduced.

Money Transmission

One of the more vexing questions cryptocurrencies created involve money transmission laws. Money transmitters are entities that take money from one customer and give it to another; common examples include Western Union and MoneyGram. As explained by Peter Van Valkenburgh, historically, States regulated and licensed money transmitters. These licensure regimes were intended to protect customers if the funds were lost or stolen. However, State licensing requires those operating across State lines to obtain a license to operate in all States and territories except Montana.[468] Normally, many take the federalist view on state laws and regulations.[469] From this perspective, States can experiment with new and novel policies and if citizens do not like it, they can move to another State. It also gives State policymakers flexibility to craft new policies that might better fit their circumstances than a uniform national policy.

Cryptocurrency and ICO emergence challenged the "states as laboratories" view on these licensing regimes. Every cryptocurrency exchange or ICO is "global on day one." This means once launched, anyone around the world can access the site and potentially use its services. Using the example of EconoCoin

above, when the new token launches the sites that traded the token for money—including the launch site itself—might theoretically have needed a license in every State. This would deter investment and research into new innovative products.

Market participants and organizations proposed multiple ways for a path forward. The Uniform Law Commission, a nonpartisan commission focused on creating consistent state laws, drafted and approved legislative text that would clearly define what virtual currency businesses need to file as money transmitters.[470] States would still need to enact the proposed legislation, which would likely take years. This delay caused others to recommend Federal alternatives. Peter Van Valkenburg listed various options, including creating a "passporting" regime similar to the European Union or Federal preemption of State transmission laws.[471] None of these solutions would be perfect, and all should undergo rigorous cost-benefit analysis.

Future Regulatory Questions

Solving the challenges cryptocurrencies and blockchains present will require unique solutions that balance the needs of consumer protection, security, and entrepreneurship. While it is impossible to determine precisely which rules, regulations, and guidance will result from this process, one thing is certain. Regulatory agencies will need to coordinate to ensure they do not work at cross purposes. America is already subject to a complex set of regulatory institutions governing financial products and transactions. As Perianne Boring of the Chamber of Digital Commerce highlighted, this regulatory web produced four different classifications of digital assets (commodity, security, currency, and property),[472] which is not conducive an environment where entrepreneurs are enthusiastic about launching a startup.

Regulators recognized the need for coordination. In the *Wall Street Journal*, SEC Chairman Jay Clayton and Commodities Futures Trading Commission Chairman J. Christopher Ginacarlo noted:

> *The CFTC and SEC, along with other federal and state regulators and criminal authorities, will continue to work together to bring transparency and integrity to these markets and, importantly, to deter and prosecute fraud and abuse.*[473]

Outside the financial space, as noted above, other executive agencies such as NIST and HHS continue working towards standards that promote compliance without needlessly halting innovation. For cryptocurrencies and blockchain to further thrive, policymakers will need collaborative and innovative solutions that set the rules of the game without overly prescriptive regulations that constrain this emerging technology from reaching its full potential

CONCLUSION

Technology presents evolving challenges and generates new solutions. Blockchain technology essentially stores and transmits data securely, in large volume, and at high speeds. So far, the technology has proved largely resistant to hacking, and given this feature, developers first applied it to digital currencies. Yet blockchain has many more potential applications, such as portable medical records and securing the critical financial and energy infrastructure that the *Report* identified.

Recommendations

➢ Policymakers and the public should become more familiar with digital currencies and other uses of blockchain

technology, which have a wide range of applications in the future.

➢ Regulators should continue to coordinate among each other to guarantee coherent policy frameworks, definitions, and jurisdiction.

➢ Policymakers, regulators, and entrepreneurs should continue to work together to ensure developers can deploy these new blockchain technologies quickly and in a manner that protects Americans from fraud, theft, and abuse, while ensuring compliance with relevant regulations.

➢ Government agencies at all levels should consider and examine new uses for this technology that could make the government more efficient in performing its functions.

ENDNOTE

[1] "Dynamism in Retreat: Consequences for Regions, Markets, and Workers," Economic Innovation Group, February 2017. http://eig.org/wp-content/uploads/2017/02/Dynamism-in-Retreat.pdf

[2] Lettieri, John, "The Decline of Economic Opportunity in the United States: Causes and Consequences," Testimony before the Joint Economic Committee, April 5, 2017. https://www.jec.senate.gov/public/_cache/files/bbb53bfb-ef4c-4182-b729-64fc1965ce78/john-lettieri-testimony-040517.pdf

[3] Deaton, Angus, "Economic Aspects of the Opioid Crisis," Testimony before the Joint Economic Committee, June 8, 2017. https://www.jec.senate.gov/public/_cache/files/37cbd2d6-da98-4d92-87bb-cb2a7ed7b91d/deaton-testimony-060817.pdf

[4] "Tracking Tax Runaways," Bloomberg, February 13, 2018. https://www.bloomberg.com/graphics/tax-inversion-tracker/

[5] Hassett, Kevin, "The Economic Outlook with CEA Chairman Kevin Hassett," Testimony before the Joint Economic Committee, October 25, 2017. https://www.jec.senate.gov/public/_cache/files/b25b92e1-0089-4479-909b-278aac7decfd/hassett-testimony.pdf

[6] Hassett, Kevin, "The Economic Outlook with CEA Chairman Kevin Hassett," Testimony before the Joint Economic Committee, October 25, 2017. https://www.jec.senate.gov/public/_cache/files/b25b92e1-0089-4479-909b-278aac7decfd/hassett-testimony.pdf

[7] "Labor Force Participation Rate," Organization for Economic Cooperation and Development. https://data.oecd.org/emp/labour-force-participation-rate.htm

[8] "GDP Percent Change from Preceding Period," Bureau of Economic Analysis. https://www.bea.gov/national/index.htm#gdp

[9] "The Heritage Foundation/Wall Street Journal Index of Economic Freedom," 2008. http://thf_media.s3.amazonaws.com/index/pdf/2008/Index2008_ExecutiveSummary.pdf "The Fraser Institute Economic Freedom Ranking 2008." https://www.fraserinstitute.org/economic-freedom/map?year=2008&page=map

[10] "The Fraser Institute Economic Freedom Ranking 2008." https://www.fraserinstitute.org/economic-freedom/map?year=2015&page=map

[11] "Index of Economic Freedom," The Heritage Foundation. http://www.heritage.org/index/ranking

[12] "Doing Business," The World Bank, p. 143, 2009. http://www.doingbusiness.org/reports/global-reports/doing-business-2009

[13] "Doing Business," The World Bank, p. 248, 2017. http://www.doingbusiness.org/reports/global-reports/doing-business-2017

[14] Cogan, John F. et al., "On the Prospects for Higher Economic Growth," Hoover Institute, July 18, 2017. https://www.hoover.org/sites/default/files/research/docs/on_the_prospects_for_higher_economic_growth_0.pdf#overlay-context=research/prospects-higher-economic-growth

[15] "Dynamism in Retreat: Consequences for Regions, Markets, and Workers," Economic Innovation Group, p. 30, February 2017. http://eig.org/wp-content/uploads/2017/02/Dynamism-in-Retreat.pdf

[16] Friedman, Milton "The 'Plucking Model' of Business Fluctuations Revisited," The Hoover Institution Stanford University, December 1988. Economist Victor Zarnowitz studied business cycles and explained that the deeper the recession the steeper the recovery. Barro, Robert, "The Reasons Behind the Obama Non-Recovery: It wasn't the severity of the Great Recession that caused the weak recovery, but government policies." *Wall Street Journal*, September 20, 2016.

[17] Cogan, John F. et al., "On the Prospects for Higher Economic Growth," Hoover Institute, July 18, 2017. https://www.hoover.org/sites/default/files/research/docs/on_the_prospects_for_higher_economic_growth_0.pdf#overlay-context=research/prospects-higher-economic-growth

[18] "Economic Report of the President (ERP) 2018," Council of Economic Advisers, p. 87, February 2018. https://www.whitehouse.gov/wp-content/uploads/2018/02/ERP_2018_Final-FINAL.pdf

[19] "Dynamism in Retreat: Consequences for Regions, Markets, and Workers," Economic Innovation Group, p 29, February 2017. http://eig.org/wp-content/uploads/2017/02/Dynamism-in-Retreat.pdf

[20] Lazear, Edward and James Spletzer, "Hiring, Churn, and the Business Cycle," The American Economic Review 102 (3) (2012), pp. 575-579.

[21] Yellen, Janet L., "The Economic Outlook with Federal Reserve Chair Janet Yellen," Testimony before the Joint Economic Committee, November 29, 2017. https://www.jec.senate.gov/public/index.cfm/2017/11/the-economic-outlook-with-federal-reserve-chair-janet-yellen

[22] "Latest Data show entrepreneurship remains subdued in the United States," Economics Innovation Group, September 21, 2017. http://eig.org/news/latest-data-show-entrepreneurship-remains-subdued-united-states

[23] Pugsley, Benjamin and Aysegul Sahin, "Grown-Up Business Cycles," Federal Reserve Bank of New York Staff Reports, p. 2, December 2014 Revised September 2015, No. 707. https://www.newyorkfed.org/medialibrary/media/research/staff_reports/sr707.pdf

[24] Hassett, Kevin, "The Economic Outlook with CEA Chairman Kevin Hassett," Testimony before the Joint Economic Committee, October 25, 2017. https://www.jec.senate.gov/public/index.cfm/2017/10/jec-to-hold-hearing-on-future-of-american-economic-growth

229

[25] "Real Median Household Income in the United States," Federal Reserve Bank of St. Louis, FRED. https://fred.stlouisfed.org/series/MEHOINUSA672N

[26] ERP 2018, pp. 103-124.

[27] "Civilian labor force participation rate, 16 years and over," Bureau of Labor Statistics. https://data.bls.gov/timeseries/LNS11300000

[28] Cogan, John F. et al., "On the Prospects for Higher Economic Growth," Hoover Institute, July 18, 2017. https://www.hoover.org/sites/default/files/research/docs/on_the_prospects_for_higher_economic_growth_0.pdf#overlay-context=research/prospects-higher-economic-growth

[29] Prior to 1990 the prime-age labor force participation rate rose steadily as an increasing number of women entered the work force. Around 1990, females' 25-54 participation leveled off around 75 percent.

[30] "Dynamism in Retreat: Consequences for Regions, Markets, and Workers," Economic Innovation Group, February 2017. http://eig.org/wp-content/uploads/2017/02/Dynamism-in-Retreat.pdf

[31] Below trend: the U.S. productivity slowdown since the Great Recession, Bureau of Labor Statistics, January 2017. https://www.bls.gov/opub/btn/volume-6/below-trend-the-us-productivity-slowdown-since-the-great-recession.htm

[32] Cogan, John F. et al., "On the Prospects for Higher Economic Growth," Hoover Institute, July 18, 2017. https://www.hoover.org/sites/default/files/research/docs/on_the_prospects_for_higher_economic_growth_0.pdf#overlay-context=research/prospects-higher-economic-growth

[33] "Labor productivity, output per hour," Bureau of Labor Statistics. https://data.bls.gov/timeseries/PRS85006092

[34] Yellen, Janet L., "The Economic Outlook with Federal Reserve Chair Janet Yellen," Testimony before the Joint Economic Committee, November 29, 2017. https://www.jec.senate.gov/public/index.cfm/2017/11/the-economic-outlook-with-federal-reserve-chair-janet-yellen

[35] *The Presidential Debates: Issues and Questions for the 2016 Elections and Beyond*, Edited by John N. Moore, Carolina Academic Press, p. 67, May 2, 2016.

[36] "An Update to the Budget and Economic Outlook: 2017 to 2027," Congressional Budget Office, June 2017, www.cbo.gov/publication/52801 . "Economic projections of Federal Reserve Board members and Federal Reserve Bank presidents under their individual assessments of projected appropriate monetary policy," September 2017. https://www.federalreserve.gov/monetarypolicy/files/fomcprojtabl20170920.pdf

[37] "Dynamism in Retreat: Consequences for Regions, Markets, and Workers," Economic Innovation Group, February 2017. http://eig.org/wp-content/uploads/2017/02/Dynamism-in-Retreat.pdf

[38] Cogan, John F. et al., "On the Prospects for Higher Economic Growth," Hoover Institute, July 18, 2017. https://www.hoover.org/sites/default/files/research/docs/on_the_prospects_for_higher_economic_growth_0.pdf#overlay-context=research/prospects-higher-economic-growth

[39] Ciccone, Antonio and Elias Papaioannou, "Red tape and delayed entry," *Journal of the European Economic Association* 5.2-3 (2007): 444-458. Branstetter, Lee, et al., "Do entry regulations deter entrepreneurship and job creation? Evidence from recent reforms in Portugal," *The Economic Journal*, 124.577 (2014): 805-832.

[40] Lazear, Edward, "The Decline in Economic Opportunity in the United States: Causes and Consequences," Testimony before the Joint Economic Committee, April 5, 2017. https://www.jec.senate.gov/public/index.cfm/hearings-calendar?ID=77BCA30A-C2A5-40C5-8CAF-6C61F821842E

[41] Kleiner, Morris M. and Alan B. Krueger, "Analyzing the extent and influence of occupational licensing on the labor market," *Journal of Labor Economics* 31. S1 (2013): S173-S202.

[42] Kleiner, Morris, *Licensing Occupations: Ensuring Quality or Restricting Competition?*, Kalamazoo, MI: Upjohn Institute, pp. 146-147, 2006.

[43] Richardson, Jamie, "Encouraging Entrepreneurship: Growing Business, Not Bureaucracy," Testimony before the Joint Economic Committee, July 12, 2016. https://www.jec.senate.gov/public/index.cfm/hearings-calendar?ID=DACBCC7F-4316-4D33-AD04-FE6B16AD0B39

[44] "The Growth Potential of Deregulation," The Council of Economic Advisers, October 2, 2017. https://www.whitehouse.gov/sites/whitehouse.gov/files/documents/The%20Growth%20Potential%20of%20Deregulation.pdf

[45] Branstetter, Lee, et al., "Do entry regulations deter entrepreneurship and job creation? Evidence from recent reforms in Portugal," *The Economic Journal*, 124.577 (2014): 805-832.

[46] Fernandes, Ana P. et al., "Firm entry deregulation, competition and returns to education and skill." *European Economic Review*, 70 (2014): 210-230.

[47] Pomerleau, Kyle, "An Overview of Pass-through Businesses in the United States," Tax Foundation, January 2015. https://taxfoundation.org/overview-pass-through-businesses-united-states/

[48] Hodge, Scott A., "The Compliance Costs of IRS Regulations," The Tax Foundation, June 2016. https://files.taxfoundation.org/legacy/docs/TaxFoundation_FF512.pdf.

[49] Hodge, Scott A., "The Startup Slump: Can Tax Reform Help Revive Entrepreneurship?" Testimony before the Joint Economic Committee, October 3, 2017. The Startup Slump: Can Tax Reform Help Revive Entrepreneurship? https://www.jec.senate.gov/public/index.cfm/hearings-calendar?ID=D47F4892-7AAF-47CA-AC0E-6ECFB04A5B96

[50] "Tax Revenues to More Than Double by 2023, While Top Tax Rates Hit Highest Level Since 1986," House of Representatives Committee on Ways

and Means, February 13, 2013. https://waysandmeans.house.gov/tax-revenues-to-more-than-double-by-2023-while-top-tax-rates-hit-highest-level-since-1986/

[51] "Corporate Income Tax Rates around the World, 2015," Tax Foundation, p. 3, September 2015.

[52] https://taxfoundation.org/corporate-income-tax-rates-around-world-2015/

[53] Hassett, Kevin, "The Economic Outlook with CEA Chairman Kevin Hassett," Testimony before the Joint Economic Committee, October 25, 2017. https://www.jec.senate.gov/public/_cache/files/b25b92e1-0089-4479-909b-278aac7decfd/hassett-testimony.pdf

[54] "Tax Reform Will Pay Growth Dividends," *Wall Street Journal*, January 5, 2018.

[55] Hsieh, Chang-Tai and Enrico Moretti, "Housing Constraints and Spatial Reallocation," NBER Working Paper, May 2017. http://www.nber.org/papers/w21154.pdf

[56] Ganong, Peter, and Daniel Shoag, "Why Has Regional Income Convergence in the US Declined?" *Journal of Urban Economics,* 102 (2017): 76-90.

[57] Furman, Jason, "Occupational Licensing and Economic Rents," The Brookings Institution, November 2, 2015. https://obamawhitehouse.archives.gov/sites/default/files/page/files/20151102_occupational_licensing_and_economic_rents.pdf

[58] Malloy, Raven et al., "Internal Migration in the United States," Finance and Economics Discussion Series Division of Research and Statistics and Monetary Affairs Federal Reserve Board, Washington, D.C., May 2011. https://www.federalreserve.gov/pubs/feds/2011/201130/201130pap.pdf

[59] Davis, Steven J. and John Haltiwanger, "Labor market fluidity and economic performance," No. w20479. National Bureau of Economic Research, 2014.

[60] ERP 2018, pp. 92-94, 152-153.

[61] Strehle, Justin and Richard Vedder, "The Diminishing Returns of a College Degree," *The Wall Street Journal*, 6/5/2017; https://www.wsj.com/articles/the-diminishing-returns-of-a-college-degree-1496605241

[62] Harrison, David T., "A Record Six Million U.S. Job Vacancies: Reasons and Remedies," Testimony before the Joint Economic Committee, p. 5, July 12, 2017. https://www.jec.senate.gov/public/_cache/files/1e6171f8-44a5-4901-a8a7-911759cbac8b/david-harrison-testimony.pdf

[63] Daniels, Mitchell E., "Financing Higher Education: Exploring Current Challenges and Potential Alternatives," Testimony before the Joint Economic Committee, September 30, 2015. http://www.jec.senate.gov/public/index.cfm/hearings-calendar?ID=7C64D2C3-1A88-423F-86E0-D524721C4AE2

[64] "Joint Economic Report (JER) 2017," Joint Economic Committee, p. 110, February 2017. https://www.jec.senate.gov/public/_cache/files/efa80f0a-f4db-

472c-9e5b-f19fe4b67c24/2-28-final-2017-joint-economic-report-w-minority-views.pdf

[65] "Our Greedy Colleges," *The New York Times,* February 18, 1987. http://www.nytimes.com/1987/02/18/opinion/our-greedy-colleges.html

[66] JER 2017, pp. 111-113.

[67] Ambrose, Brent et al., "The Impact of Student Loan Debt on Small Business Formation," Federal Reserve Bank of Philadelphia Working Papers, July 2015. https://www.philadelphiafed.org/-/media/research-and-data/publications/working-papers/2015/wp15-26.pdf

[68] Case, Anne and Angus Deaton, "Mortality and morbidity in the 21st century," Brookings Papers on Economic Activity, 2017. https://www.brookings.edu/bpea-articles/mortality-and-morbidity-in-the-21st-century/

[69] "Hiring Hurdle: Finding Workers Who Can Pass a Drug Test," *New York Times*, May 17, 2016. https://www.nytimes.com/2016/05/18/business/hiring-hurdle-finding-workers-who-can-pass-a-drug-test.html?_r=0

[70] Griswold, Daniel, "The Dynamic Gains From Free Digital Trade," Testimony before the Joint Economic Committee, September 12, 2017. https://www.jec.senate.gov/public/index.cfm/2017/9/jec-to-hold-hearing-on-dynamic-gains-from-free-digital-trade

[71] Mulligan, Casey B., "The Redistribution Recession," Oxford University Press, pp. 5-8, 2012.

[72] Furchtgott-Roth, Diana, "A Record Six Million U.S. Job Vacancies: Reasons and Remedies," Testimony before the Joint Economic Committee, July 12, 2017. https://www.jec.senate.gov/public/index.cfm/2017/7/a-record-six-million-u-s-job-vacancies-reasons-and-remedies

[73] Kane, Timothy, "The Decline in Economic Opportunity in the United States: Causes and Consequences," Testimony before the Joint Economic Committee, April 5, 2017. https://www.jec.senate.gov/public/index.cfm/hearings-calendar?ID=77BCA30A-C2A5-40C5-8CAF-6C61F821842E

[74] Lazear, Edward, "The Decline in Economic Opportunity in the United States: Causes and Consequences," Testimony before the Joint Economic Committee, April 5, 2017. https://www.jec.senate.gov/public/index.cfm/hearings-calendar?ID=77BCA30A-C2A5-40C5-8CAF-6C61F821842E

[75] The inflation rate is measured by the GDP deflator. 1990 was selected as the start year to analyze these averages as inflation had been trending downward as a result of the Great Inflation of the 1970s and the Volcker Fed's efforts to diffuse it. After 1990, the inflation rate stabilized around 2 percent.

[76] ERP 2018, pp. 20.

[77] ERP 2018, pp. 432.

[78] ERP 2018, pp. 422.

[79] "Monetary Policy Report," Board of Governors of the Federal Reserve System, February 23, 2018, p. 14,

https://www.federalreserve.gov/monetarypolicy/files/20180223_mprfullreport.pdf

[80] "Nominal" means unadjusted for inflation. "Aggregate demand" means total spending in the economy.

[81] *"Economic growth was moderate during the first half of the year, but the tightening of credit conditions has the potential to intensify the housing correction and to restrain economic growth more generally. Today's action is intended to help forestall some of the adverse effects on the broader economy that might otherwise arise from the disruptions in financial markets and to promote moderate growth over time."* "FOMC Statement," Board of Governors of the Federal Reserve System, September 18, 2007, https://www.federalreserve.gov/newsevents/pressreleases/monetary20070918a.htm

[82] The first such facility was the Term Auction Facility (TAF), in which the Federal Reserve, *"...auctioned term funds to depository institutions. All depository institutions that were eligible to borrow under the primary credit program were eligible to participate in TAF auctions. All advances were fully collateralized. Each TAF auction was for a fixed amount, with the rate determined by the auction process (subject to a minimum bid rate). Bids were submitted by phone through local Reserve Banks. The final Term Auction Facility auction was conducted on March 8, 2010."* "Term Auction Facility," Board of Governors of the Federal Reserve System, November 24, 2015 (last update), https://www.federalreserve.gov/monetarypolicy/taf.htm, For other such facilities refer to: "Expired Policy Tools," Board of Governors of the Federal Reserve System, November 24, 2015 (last update), https://www.federalreserve.gov/monetarypolicy/expiredtools.htm

[83] Hetzel, Robert L, "The Great Recession," *Cambridge University Press*, New York, NY, 2012, p. 282.

[84] Sumner, Scott, "Monetary policy rules in light of the great recession," Journal of Macroeconomics, Elsevier, vol. 54(PA), p. 94. See also: Bernanke, Ben S, "Speech Given at the Federal Reserve Bank of Dallas Conference on the Legacy of Milton and Rose Friedman's *Free to Choose*," The Federal Reserve Board, October 23, 2003. https://www.federalreserve.gov/boardDocs/Speeches/2003/20031024/default.htm

[85] For a more complete history of the Federal Reserve's emergency lending, commercial and shadow banking and analysis of the factors in the 2008 Financial Crisis, see the Joint Economic Committee paper, "Lender of Last Resort in the Modern Financial System: Development of the Federal Reserve's Policy," Joint Economic Committee, November 29, 2012, https://www.jec.senate.gov/public/_cache/files/8b7982e8-5ac5-4ec7-8944-0b5584f71d5d/20121129-jec-lolr-analysis.pdf.pdf

[86] This was known as the Treasury's Supplementary Financing Program. See: "Treasury Announces Supplementary Financing Program," U.S. Department of the Treasury press release HP-1144, September 9, 2008,

https://www.treasury.gov/press-center/press-releases/Pages/hp1144.aspx. Ben Bernanke's 2009 description of the program: *"...the Treasury issues special Treasury bills and places the proceeds in the Treasury supplementary financing account at the Federal Reserve. The net effect of these operations is to drain reserve balances from depository institutions,"*Bernanke, Ben S, "The Federal Reserve Balance Sheet," Board of Governors of the Federal Reserve System, April 3, 2009,
https://www.federalreserve.gov/newsevents/speech/bernanke20090403a.htm
[87] *"Inflation has been high, spurred by the earlier increases in the prices of energy and some other commodities. The Committee expects inflation to moderate later this year and next year, but the inflation outlook remains highly uncertain.*
"The downside risks to growth and the upside risks to inflation are both of significant concern to the Committee. The Committee will monitor economic and financial developments carefully and will act as needed to promote sustainable economic growth and price stability."
"FOMC Statement," Board of Governors of the Federal Reserve System, September 16, 2008.
https://www.federalreserve.gov/newsevents/pressreleases/monetary20080916a.htm. For additional evidence refer to: Hetzel, Robert L, "The Great Recession," *Cambridge University Press*, New York, NY, 2012, pp. 217-223.
[88] This was written into the Emergency Economic Stabilization Act of 2008 (the same legislation that created the Troubled Asset Relief Program (TARP), which bailed out the banks. It authorized the Fed to pay interest on reserves, of which there are two classes: required and excess. The IORR rate is the payment banks receive for *required* reserve holdings (excluding vault cash held to satisfy reserve requirements). The IOER rate is the payment banks receive for depositing funds in *excess* of their required reserves. As the latter is far more consequential, IORR is not discussed in this chapter.
[89] The Federal Reserve's rationale was that *"The payment of interest on excess reserve balances will give the Federal Reserve greater scope to use its lending programs to address conditions in credit markets while also maintaining the federal funds rate close to the target established by the Federal Open Market Committee."*
"Board announces that it will begin to pay interest on depository institutions' required and excess reserve balances." Board of Governors of the Federal Reserve System, October 6, 2008,
https://www.federalreserve.gov/newsevents/pressreleases/monetary20081006a.htm
[90] Bernanke, Ben S, *The Courage to Act*, W.W. Norton, New York, NY, 2015, pp. 325–6.
[91] Pure usage (as opposed to the general usage) of the term "quantitative easing" refers to an increase in the supply of reserves intended to ease monetary conditions. In contrast, the incidentally created reserves from the Fed's LSAP programs were largely sterilized as the Fed was focusing on directing liquidity toward particular market segments (i.e., long-term Treasury

securities and residential MBS), which constitutes a credit easing policy (also Ben Bernanke's term, see next footnote) rather than a monetary easing policy.

[92] *In pursuing our strategy, which I have called 'credit easing,' we have also taken care to design our programs so that they can be unwound as markets and the economy revive."* Bernanke, Ben S, "The Federal Reserve Balance Sheet," Board of Governors of the Federal Reserve System, April 3, 2009, https://www.federalreserve.gov/newsevents/speech/bernanke20090403a.htm. Note: Bernanke's identification of QE1 as "credit easing" implies that the intent to sterilize the expansion using IOER.

[93] Duy, Tim. "Johnson and Kwak vs. Bernanke," Tim Duy's Fed Watch, April 3, 2009, http://economistsview.typepad.com/timduy/2009/04/johnson-and-kwak-vs-bernanke.html

[94] *"If the monetary injections are expected to be temporary, the inflationary effect is far smaller. The Japanese central bank did lots of QE in 2003, but pulled much of the money out in 2006 when deflation ended. It worked in preventing high inflation, indeed it may have worked too well."* Sumner, Scott. "Open Letter to Conservatives on Monetary Policy," The American Catholic, November 16, 2010, http://the-american-catholic.com/2010/11/16/open-letter-to-conservatives-on-monetary-policy/

[95] *"...[if] the monetary base is increased in the current period but is expected to be fully offset in some future period there will be zero change in the price level."* Beckworth, David, "Permanent versus Temporary Monetary Base Injections: Implications for Past and Future Fed Policy," *Journal of Macroeconomics,* Vol. 54, Part A, December 2017, p. 113.

[96] *"But a monetary expansion the private sector expected to be temporary, to be wound down after the crisis had passed, would do nothing at all: the extra monetary base would just sit there."* Krugman, Paul, "It's Baaack, Twenty Years Later, February 2018, p. 5, https://www.gc.cuny.edu/CUNY_GC/media/LISCenter/pkrugman/Its-baaack.pdf

[97] *"If the Fed pays interest on reserves, then the quantity theory of money (more money means more inflation) doesn't necessarily hold. They recently started paying interest on reserves, and that's one reason why the big injections from 2008 didn't have an inflationary impact. The Fed can adjust the rate as necessary, and indeed in my view a lower IOR [interest on reserves] would be more effective than QE2."* Sumner, Scott, "Open Letter to Conservatives on Monetary Policy," The American Catholic, November 16, 2010, http://the-american-catholic.com/2010/11/16/open-letter-to-conservatives-on-monetary-policy/

[98] *"The link between Fed bond purchases and the subsequent growth of the money stock changed after 2008, because the Fed began to pay interest on excess reserves. The interest rate on these totally safe and liquid deposits induced the banks to maintain excess reserves at the Fed instead of lending and creating deposits to absorb the increased reserves, as they would have done before 2008."* Feldstein, Martin, "Why is US Inflation So Low?" Project

Syndicate, June 28, 2013, p. 2.
http://www.nber.org/feldstein/projectsyndicatejune2013.pdf

[99] *"…[The] large expansion of the monetary base has to be temporary otherwise the price level would have jumped several hundred percent already…Ostensibly for this reason the Fed has been very clear that it plans to eventually reduce its balance sheet. In the meantime, the Fed is using IOER to manage its balance sheet in a manner that effectively sterilizes the above-trend growth in the monetary base. The use of the IOER reinforces the Fed's goals that the excess reserves are to be ultimately temporary."* Beckworth, David, "Permanent versus Temporary Monetary Base Injections: Implications for Past and Future Fed Policy," *Journal of Macroeconomics,* Vol. 54, Part A, December 2017, p. 114.

[100] Selgin, George, "Testimony Before the U.S. House of Representatives Committee on Financial Services Monetary Policy and Trade Subcommittee Hearing on "Monetary Policy v. Fiscal Policy: Risks to Price Stability and the Economy." July 20, 2017, p. 36,
https://financialservices.house.gov/uploadedfiles/hhrg-115-ba19-wstate-gselgin-20170720.pdf

[101] *"First, paying interest on reserves made monetary policy tighter than it would otherwise have been, as measured either by the higher federal funds rate or the lower equilibrium price level implied by the shifting but still intersecting demand and supply curves for reserves. Ex ante, the use of interest on reserves to minimize the effects of emergency lending on the price level seemed prudent. Ex post, however, it turned out to be a mistake: as Hetzel (2012) points out, monetary policy ought to have been substantially more accommodative than it was throughout 2008, considering the severe deflationary recession that followed."* Ireland, Peter N, "Interest on Reserves: History and Rationale, Complications and Risks," Boston College and Shadow Open Market Committee, February 2018, p. 3,
http://irelandp.com/papers/somc201803.pdf

[102] Blinder, Alan, "How Ben Bernanke Can Get Banks Lending Again," *The Wall Street Journal*, July 22, 2012,
https://www.wsj.com/articles/SB10000872396390444873204577537212738938798

[103] Blinder, Alan, "The Fed Plan to Revive High-Powered Money," *The Wall Street Journal*, December 10, 2013.
https://www.wsj.com/articles/the-fed-plan-to-revive-highpowered-money-1386718437

[104] "Financial Services Regulatory Relief Act," Public Law 109-351, October 13, 2006, p. 4, https://www.congress.gov/109/plaws/publ351/PLAW-109publ351.pdf

[105] "Rules and Regulations," *Federal Register*, Vol. 80, No. 119, June 22, 2015, Refer to subsection 204.10 (3), p. 35,567,
https://www.gpo.gov/fdsys/pkg/FR-2015-06-22/pdf/2015-15238.pdf. Note: it is not feasible to set the primary credit rate below the IOER rate as banks could borrow from the Fed at a lower rate and earn a higher rate of return by

depositing the borrowings with the Fed. Thus, the Fed's balance sheet would grow infinitely. By citing the primary credit rate as a relevant short-term interest rate, the Fed remains in de facto compliance with the law.

[106] Hensarling, Jeb, "Hensarling Welcomes Powell for First Monetary Policy Hearing," House Financial Services press release, February 27, 2018, https://financialservices.house.gov/news/documentsingle.aspx?DocumentID=403092

[107] Taylor, John B, "Alternatives for Reserve Balances and the Fed's Balance Sheet in the Future," *Hoover Institution Press,* Stanford, CA, 2018, p. 24, https://web.stanford.edu/~johntayl/2018_pdfs/Alternatives_for_Reserve_Balances_and_the_Fed's_Balance_Sheet_in_the_Future.pdf

[108] Hetzel, Robert L, "Monetary Policy in the 2008-2009 Recession," *Economic Quarterly*—Vol. 95, No. 2, Spring 2009, p. 216, https://www.richmondfed.org/~/media/richmondfedorg/publications/research/economic_quarterly/2009/spring/pdf/hetzel2.pdf

[109] Taylor, John B, "Interest on Reserves and the Fed's Balance Sheet," *Cato Journal*, Vol. 36, No. 3, Fall 2016, p. 719, https://web.stanford.edu/~johntayl/2016_pdfs/Interest_on_Reserves_and_the_Feds_Balance_Sheet_Cato-Fall2016.pdf

[110] Nelson, Bill, "A former Fed insider explains the internal debate over QE3," *Financial Times Alphaville*, February 16, 2018, https://ftalphaville.ft.com/2018/02/16/2198845/guest-post-a-former-fed-insider-explains-the-internal-debate-over-qe3/

[111] Summers, Lawrence H, "U.S. Economic Prospects: Secular Stagnation, Hysteresis, and the Zero Lower Bound, " *Business Economics*, Vol. 49, No. 2, February 24, 2014, p. 66, http://larrysummers.com/wp-content/uploads/2014/06/NABE-speech-Lawrence-H.-Summers1.pdf

[112] ERP 2018, p. 17 and p. 388.

[113] Friedman, Milton, "The 'Plucking Model' of Business Cycle Fluctuations Revisited," The Hoover Institution, Stanford University, December 1988, p. 2.

[114] Barro, Robert J. and Tao Jin, "Rare Events and Long-Run Risks," *NBER Working Paper*, No. 21871, January 2016, http://www.nber.org/papers/w21871

[115] Barro, Robert J, "The Reasons Behind the Obama Non-Recovery," *The Wall Street Journal*, September 20, 2016, https://www.wsj.com/articles/the-reasons-behind-the-obama-non-recovery-1474412963

[116] In contrast, the Obama Administration's *2017 Economic Report of the President* lauded the "forceful response of the Federal Government (p. 28)" for the "remarkable recovery (p. 21)." *Economic Report of the President 2017*, Council of Economic Advisers, January 2017, https://obamawhitehouse.archives.gov/administration/eop/cea/economic-report-of-the-President/2017

[117] Selgin, George, "Testimony Before the U.S. House of Representatives Committee on Financial Services Monetary Policy and Trade Subcommittee Hearing on "Monetary Policy v. Fiscal Policy: Risks to Price Stability and the

Economy," July 20, 2017, p. 46,
https://financialservices.house.gov/uploadedfiles/hhrg-115-ba19-wstate-gselgin-20170720.pdf

[118] Feldstein, Martin, "Stocks are Headed for a Fall," *The Wall Street Journal,* January 17, 2018. https://www.wsj.com/articles/stocks-are-headed-for-a-fall-1516145624

[119] "The Budget and Economic Outlook: Fiscal Years 2008 to 2017: January 2007," Congressional Budget Office, January 24, 2007, Table 2-2, p. 41, https://www.cbo.gov/sites/default/files/110th-congress-2007-2008/reports/01-24-budgetoutlook.pdf

[120] The BLS series ended in 2016. JEC linearly interpolated it forward to February 2018. The projections come from:
Toossi, Mitra. "Labor force projections to 2016: more workers in the golden years," *Monthly Labor Review*, Bureau of Labor Statistics, November 2007, https://stats.bls.gov/opub/mlr/2007/11/art3full.pdf

[121] Laubach, Thomas, and John C. Williams, "Measuring the Natural Rate of Interest," *Review of Economics and Statistics*, 85(4), November 2003, pp. 1063–70.

[122] Guvenen, F., R. Mataloni, D. Rassier, and K. Ruhl, "Offshore Profit Shifting and Domestic Productivity Measurement," *NBER Working Paper*, No. 23324, April 2017, http://www.nber.org/papers/w23324

[123] Economic theory suggests that all available information is taken into account when financial instruments are valued. The day before the November 2016 election, prediction markets (exchanges for financial instruments of which the value depends on some outcome being realized, such as election results) estimated that the pre-2017 political and economic status quo would be largely maintained (For example, on November 7, 2016, prediction markets had implied presidential candidate Hillary Clinton had an 82 percent chance of winning the election (see: https://www.predictit.org/Market/1234/Who-will-win-the-2016-US-presidential-election) and the current Majority had a 59 percent chance of losing that position in the Senate (see: https://www.predictit.org/Contract/571/Will-Republicans-maintain-a-Senate-majority-after-the-next-election#data). The election results seem to have surprised financial markets, providing a clear indicator that a change in the political status quo had a substantive impact on the economic outlook.

[124] When the forecast period ended before 2018, the Majority staff used the final forecast growth rate to interpolate the implied level of potential real GDP for 2028.

[125] ERP 2018, p. 446.

[126] As the proportion of goods and services produced rises relative to money, this pushes inflation rates down.

[127] Specifically, the average hourly earnings for all employees on private nonfarm payrolls registered a gain of 2.9 percent as reported in the February 2, 2018 release of the BLS January Employment Situation report, https://www.bls.gov/news.release/archives/empsit_02022018.htm

[128] Feldstein, Martin, "Stocks are Headed for a Fall," *The Wall Street Journal,* January 17, 2018,
https://www.wsj.com/articles/stocks-are-headed-for-a-fall-1516145624

[129] ERP 2018, pp. 437-9.

[130] Christensen, Lars, "Fed NGDP targeting would greatly increase global financial stability," *The Market Monetarist,* March 19, 2013,
https://marketmonetarist.com/2013/03/19/fed-ngdp-targeting-would-greatly-increase-global-financial-stability/

[131] Hetzel, Robert L, "The Great Recession," *Cambridge University Press*, New York, NY, 2012, p. 279.

[132] Hall, Keith, "Estimated Deficits and Debt Under the Conference Agreement of H.R. 1, a Bill to Provide for Reconciliation Pursuant to Titles II and V of the Concurrent Resolution on the Budget for Fiscal Year 2018, as filed by the Conferees to H.R. 1 on December 15, 2017," Congressional Budget Office, January 2, 2018, https://www.cbo.gov/system/files/115th-congress-2017-2018/costestimate/53437-wydenltr.pdf

[133] "The 2017 Long-Term Budget Outlook," Congressional Budget Office, March 30, 2017,
https://www.cbo.gov/publication/52480

[134] Dodd-Frank also held back lending by smaller banks.

[135] The rationale behind the five year lag to the effective date for interest on reserves to begin is described by then Federal Reserve Chairman Ben Bernanke, during an FOMC meeting: *"Because of budget-scoring rules, the provisions of this act will not take place until October 2011."* Meeting of the Federal Open Market Committee October 24-25, 2006, The Board of Governors of the Federal Reserve System, October 24-25, 2006, p. 3. https://www.federalreserve.gov/monetarypolicy/files/FOMC20061025meeting.pdf

[136] Then Federal Reserve vice chair, Donald Kohn, in a Congressional Hearing when the topic was first discussed in 2005, noted that: *"Having the authority to pay interest on excess reserves also could help mitigate potential volatility in overnight interest rates. If the Federal Reserve was authorized to pay interest on excess reserves, and did so, the rate paid would act as a minimum for overnight interest rates, because banks would not generally lend to other banks at a lower rate than they could earn by keeping their excess funds at a Reserve Bank."* Kohn, Donald. "Regulatory Relief," Testimony before the Subcommittee on Financial Institutions and Consumer Credit, Committee on Financial Services, U.S. House of Representatives, June 9, 2005.

[137] Under this arrangement, the fed funds rate should not rise above the discount rate because it would be less expensive for banks to borrow reserves directly from the Fed's discount window.

[138] JER 2017, Chapter 8.

[139] "The Startup Slump: Can Tax Reform Help Revive American Entrepreneurship?" Joint Economic Committee, October 3, 2017.
https://www.jec.senate.gov/public/index.cfm/hearings-calendar?ID=D47F4892-7AAF-47CA-AC0E-6ECFB04A5B96

[140] "Dynamism in Retreat: Consequences for Regions, Markets, and Workers," Economic Innovation Group, pp. 29, 30, February 2017. http://eig.org/wp-content/uploads/2017/02/Dynamism-in-Retreat.pdf

[141] "Economic Growth and Tax Policy," Joint Committee on Taxation, p. 2-3, February 20, 2015. https://www.jct.gov/publications.html?func=startdown&id=4736

[142] Mankiw, Greg, "How are wages and productivity related?" Greg Mankiw's Blog, August 29, 2006. http://gregmankiw.blogspot.com/2006/08/how-are-wages-and-productivity-related.html

[143] Hodge, Scott A., "The Compliance Costs of IRS Regulations," Tax Foundation, June 2016. https://files.taxfoundation.org/legacy/docs/TaxFoundation_FF512.pdf

[144] JER 2017, Chapter 8.

[145] "Distributional Effects of the Conference Agreement for H.R. 1, the 'Tax Cuts and Jobs Act'," Joint Committee on Taxation, December 18, 2017. https://www.jct.gov/publications.html?func=startdown&id=5054

[146] "Updated 2018 Withholding Tables Now Available; Taxpayers Could See Paycheck Changes by February," Internal Revenue Service, January 11, 2018. https://www.irs.gov/newsroom/updated-2018-withholding-tables-now-available-taxpayers-could-see-paycheck-changes-by-february

[147] "Evaluating the Anticipated Effects of Changes to the Mortgage Interest Deduction," Council of Economic Advisers, November 2017. https://www.whitehouse.gov/sites/whitehouse.gov/files/images/Effects%20of%20Changes%20to%20the%20Mortgage%20Interest%20Deduction%20FINAL.pdf

[148] "Macroeconomic Analysis of the Conference Agreement for H.R. 1, the 'Tax Cuts and Jobs Act'," Joint Committee on Taxation, p. 5, December 22, 2017. https://www.jct.gov/publications.html?func=startdown&id=5055

[149] Giertz, Seth H. et al., "The Elasticity of Taxable Income with Respect to Marginal Tax Rates: A Critical Review," *Journal of Economic Literature*, 50:1, 3-50, 2012. https://eml.berkeley.edu/~saez/saez-slemrod-giertzJEL12.pdf

[150] Barro, Robert J., "Tax Reform Will Pay Growth Dividends; the effects will be even larger thanks to last-minute cuts in marginal individual rates," *Wall Street Journal*, January, 4, 2018. https://www.wsj.com/articles/tax-reform-will-pay-growth-dividends-1515110902 . In joint research with Charles Redlick published in the *Quarterly Journal of Economics*, Robert Barro showed that higher marginal income tax rates have significantly negative effects on GDP. Barro derives the TCJA's growth effect using estimates from this study and the Tax Policy Center's estimate that marginal income tax rates will fall a weighted average of 3.2 percentage points through 2019.

[151] ERP 2018, p. 70.

[152] ERP 2018, pp. 56-57.

[153] "Macroeconomic Analysis of the Conference Agreement for H.R. 1, the 'Tax Cuts and Jobs Act'," Joint Committee on Taxation, p. 6, December 22, 2017. https://www.jct.gov/publications.html?func=startdown&id=5055

[154] "Distributional Effects of the Conference Agreement for H.R. 1, the 'Tax Cuts and Jobs Act'," Joint Committee on Taxation, December 18, 2017. https://www.jct.gov/publications.html?func=startdown&id=5054

[155] "Table 2.7 All Returns: Affordable Care Act Items, by Size of Adjusted Gross Income, Tax Year 2014," Internal Revenue Service, Publication 1304, August 2016. https://www.irs.gov/pub/irs-soi/14in27aca.xls

[156] "Income Tax Returns with Exemptions and Itemized Deductions," Internal Revenue Service, 2015. https://www.irs.gov/statistics/soi-tax-stats-individual-statistical-tables-by-size-of-adjusted-gross-income#_grp2

[157] ERP 2018, Figure 1-10, p. 54.

[158] "SOI Tax Stats – Individual Income Tax Returns Publication 1304," Internal Revenue Service, January 2018. https://www.irs.gov/statistics/soi-tax-stats-individual-income-tax-returns-publication-1304-complete-report

[159] "Selected Issues Relating to Choice of Business Entity," Testimony before the Senate Finance Committee, Joint Committee on Taxation, p. 5, August 1, 2012. https://www.jct.gov/publications.html?func=startdown&id=4478

[160] "Tax Revenues to More Than Double by 2023, While Top Tax Rates Hit Highest Level Since 1986," House of Representatives Ways and Means Committee, February 13, 2013. http://waysandmeans.house.gov/tax-revenues-to-more-than-double-by-2023-while-top-tax-rates-hit-highest-level-since-1986/

[161] Public Law 99-514.

[162] 26 U.S.C. 179.

[163] "How To Depreciate Property," Internal Revenue Service, Publication 946, February 28, 2018. https://www.irs.gov/pub/irs-pdf/p946.pdf

[164] 26 U.S.C. 179.

[165] "Learn about Productivity," Bureau of Labor Statistics. https://www.bls.gov/lpc/

[166] "Options for Reforming America's Tax Code," Tax Foundation, June 6, 2016. https://taxfoundation.org/options-reforming-americas-tax-code/

[167] "Table II.1 Corporate income tax rate," OECD, https://stats.oecd.org/Index.aspx?DataSetCode=TABLE_II1

[168] The graph includes average combined corporate income tax rates for OECD member nations (Australia, Canada, France, Germany, Italy, Netherlands, Norway, Sweden, Switzerland, and the United Kingdom). Except for the United States, these were the only countries with OECD tax data going back to 1981. In the same graph, reinvested earnings on U.S. direct investment abroad are shown as a percent of income receipts on assets. The data source is BEA's Table 1.6 Sources and Uses of Private Enterprise Income.

[169] "American Jobs Creation Act of 2004," Public Law 108-357, October 22, 2004. https://www.congress.gov/108/plaws/publ357/PLAW-108publ357.pdf

[170] Congressional Budget Office (CBO), "An Analysis of Corporate Inversions," p. 4, September 2017. https://www.cbo.gov/system/files/115th-congress-2017-2018/reports/53093-inversions.pdf

[171] CBO, p. 14.

[172] CBO, p. 15.

[173] "Macroeconomic Analysis of the Conference Agreement for H.R. 1, the 'Tax Cuts and Jobs Act'," Joint Committee on Taxation, pp. 6-7, December 22, 2017. https://www.jct.gov/publications.html?func=startdown&id=5055

[174] "List of Tax Reform Good News," Americans for Tax Reform. https://www.atr.org/list

[175] ERP 2018, Box 1-1, p. 50.

[176] "Modeling the Distribution of Taxes on Business Income," Joint Committee on Taxation, October 16, 2013. https://www.jct.gov/publications.html?func=startdown&id=4528

[177] JCT cites Harry Grubert and John Mutti, "The Taxation of Capital Income in an Open Economy: The Importance of Resident-Nonresident Tax Treatment," Journal of Public Economics 27, August 1985, pp. 291-309 and Julie Anne Cronin et al., "U.S. Treasury Distributional Analysis Methodology," Office of Tax Analysis Working Paper, 2012.

[178] ERP 2018, p. 64.

[179] ERP 2018, p. 49.

[180] Rosenthal, Steven M., "Integrating the Corporate and Individual Tax Systems: The Dividends Paid Deduction Considered," Urban-Brookings Tax Policy Center, p. 3, May 17, 2016. https://www.finance.senate.gov/imo/media/doc/16MAY2016Rosenthal.pdf

[181] ERP 2018, pp. 38-41.

[182] "Form 6251 Alternative Minimum Tax – Individuals," Internal Revenue Service. https://www.irs.gov/pub/irs-pdf/f6251.pdf

[183] Solomon, Eric, "Alternative Minimum Tax," Testimony before the House of Representatives Ways and Means Committee, March 7, 2007. https://www.treasury.gov/press-center/press-releases/Pages/hp299.aspx

[184] "SOI Tax Stats – Individual Statistical Tables by Size of Adjusted Gross Income," Internal Revenue Service, 2015 tax year (2016 tax filing season). https://www.irs.gov/statistics/soi-tax-stats-individual-statistical-tables-by-size-of-adjusted-gross-income

[185] "Statistics of Income – 2015, Individual Income Tax Returns, Line Item Estimates," Internal Revenue Service, p. 8, 2015. https://www.irs.gov/pub/irs-soi/15inlinecount.pdf

[186] "Small Business Tax Rates and Tax Complexity," National Federation of Independent Business. http://www.nfib.com/cribsheets/small-business-tax-rates/

[187] "Accounting Periods and Months, Publication 538," Internal Revenue Service, February 9, 2017. https://www.irs.gov/pub/irs-pdf/p538.pdf

[188] "Tax Cuts and Jobs Act, Conference Report to Accompany H.R. 1," House of Representatives, pp. 379-80, December 15, 2017. https://www.congress.gov/115/crpt/hrpt466/CRPT-115hrpt466.pdf

[189] Hodge, Scott A., "The Four Pillars of Corporate Tax Reform," Testimony before the Senate Committee on Finance, p. 6, September 19, 2017. https://www.finance.senate.gov/imo/media/doc/Hodge-Senate-Testimony.pdf

[190] "The 2017 Long-Term Budget Outlook," Congressional Budget Office, March 30, 2017. https://www.cbo.gov/publication/52480

[191] "GDP Growth Projections," Office of Management and Budget, FY2010. https://obamawhitehouse.archives.gov/sites/default/files/omb/budget/fy2017/assets/historicadministrationforecasts.xls

[192] "The Budget and Economic Outlook: 2016 to 2026," Congressional Budget Office, p. 119, January 2016. https://www.cbo.gov/sites/default/files/114th-congress-2015-2016/reports/51129-2016outlook.pdf

[193] "Table 7.1 – Federal Debt at the End of Year: 1940 – 2023," Office of Management and Budget. https://www.whitehouse.gov/omb/historical-tables/

[194] "An Update to the Budget and Economic Outlook: 2017 to 2027," Congressional Budget Office, June 2017. https://www.cbo.gov/system/files/115th-congress-2017-2018/reports/52801-june2017outlook.pdf

[195] "An Update to the Budget and Economic Outlook: 2017 to 2027," Congressional Budget Office, Table 1, p. 13, June 2017. https://www.cbo.gov/system/files/115th-congress-2017-2018/reports/52801-june2017outlook.pdf

[196] Bishop-Henchman, Joseph, "Details of the Fiscal Cliff Tax Deal," Tax Foundation, January 1, 2013. https://taxfoundation.org/details-fiscal-cliff-tax-deal/

[197] ERP 2018, p. 55.

[198] Romer, Christina D. and David H. Romer, "The Macroeconomic Effects of Tax Changes: Estimates Based on a New Measure of Fiscal Shocks," *American Economic Review,* 100 (3): pp. 763-801, June 2010. https://eml.berkeley.edu/~dromer/papers/RomerandRomerAERJune2010.pdf

[199] "An Update to the Budget and Economic Outlook: 2017 to 2027," Congressional Budget Office, p. 13, June 2017, https://www.cbo.gov/system/files/115th-congress-2017-2018/reports/52801-june2017outlook.pdf and "Estimated Budget Effects of the Conference Agreement for H.R. 1, the 'Tax Cuts and Jobs Act'," Joint Committee on Taxation, p. 8, December 18, 2017. https://www.jct.gov/publications.html?func=startdown&id=5053

[200] "Macroeconomic Analysis of the Conference Agreement for H.R. 1, the 'Tax Cuts and Jobs Act'," Joint Committee on Taxation, December 22, 2017. https://www.jct.gov/publications.html?func=startdown&id=5055

[201] ERP 2018, p. 68.

[202] "Macron turns to reforming France after electoral earthquake," *Financial Times*, June 19, 2017. https://www.ft.com/content/391d17de-5273-11e7-bfb8-997009366969

[203] Hayek, F.A., "The Road to Serfdom," The University of Chicago Press edited by Bruce Caldwell, p.113, 2007.

[204] Greenberg, Scott, "Federal Tax Laws and Regulations are Now Over 10 Million Words Long," Tax Foundation, October 8, 2015. https://taxfoundation.org/federal-tax-laws-and-regulations-are-now-over-10-million-words-long/

[205] McLaughlin, Patrick, "Regulatory Data on Trump's First Year," Mercatus Center at George Mason University, January 30, 2018; https://www.mercatus.org/publications/regulatory-data-trump-first-year ; and "The Impossibility of Comprehending, or Even Reading, All Federal Regulations," The Mercatus Center, George Mason University, October 23, 2017; https://www.mercatus.org/publications/impossibility-comprehending-or-even-reading-all-federal-regulations. For alternatives to prescriptive social regulation, see, for example, *Free Market Environmentalism* (Revised Edition), by Terry L. Anderson and Donald R. Leal, Palgrave, 2001.

[206] The Obama Administration's last report remained a draft, "2016 Draft Report to Congress on the Benefits and Costs of Federal Regulations and Agency Compliance with the Unfunded Mandates Reform Act," Office of Management and Budget, Office of Information and Regulatory Affairs, December 23, 2016. https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/assets/legislative_reports/draft_2016_cost_benefit_report_12_14_2016_2.pdf

[207] The Trump OIRA is merely listing the costs calculated by executive agencies under the Obama Administration without endorsing them.

[208] Most costs of regulation are tangible and precede the benefits. Social regulation (environmental, workplace, consumer) predominates over economic regulation (price and output) and is credited with benefits that in large part are not tangible and tradable (although economists assign dollar values to them for cost-benefit analysis). Proponents of social regulation may characterize regulatory costs as "investments," borrowing that term from the private economy, but financial investments face budget constraints and when they generate a positive return, it is convertible to tradable goods and services. Private investments for particular purposes can outpace investment recovery and returns only for a limited time and to a limited extent. Benefits must materialize to justify continued investments, and investments are put off when market conditions are unfavorable, unlike federal regulation.

[209] "Macroeconomic Impacts of Federal Regulation of the Manufacturing Sector," NERA Economic Consulting, 1255 23rd Street, NW, Washington, DC 20037, August 21, 2012; Commissioned by Manufacturers Alliance for Productivity and Innovation.

[210] See the *REINS Act*, H.R. 26 (115th Congress). https://www.congress.gov/bill/115th-congress/house-bill/26

[211] President Ronald Reagan instituted cost-benefit analysis by executive order to executive agencies and since then every Administration has continued the practice but independent Federal agencies are not subject to the requirement. The determinations resulting from cost-benefit analysis also are not legally binding.

[212] See *Vice Chairman* Senator Lee's proposed *Regulatory Budget Act.*
[213] "Obama Asks EPA to Pull Ozone Rule," *The Wall Street Journal*, September 3, 2011.
[214] "Digest of Education Statistics, 2015," National Center for Education Statistics, p.5, December 2016. https://nces.ed.gov/pubs2016/2016014.pdf
[215] "Digest of Education Statistics, 2015," National Center for Education Statistics, p.8, December 2016. https://nces.ed.gov/pubs2016/2016014.pdf
[216] "Education Expenditure by Country," National Center for Education Statistics, Published May 2017, Web. January 2018. https://nces.ed.gov/programs/coe/indicator_cmd.asp
[217] "Digest of Education Statistics, 2016," National Center for Education Statistics, Web. January 2018. https://nces.ed.gov/programs/coe/indicator_cmd.asp
[218] OECD (2016), PISA 2015 Results (Volume I): Excellence and Equity in Education, PISA OECD Publishing, Paris, p. 44, December 6, 2016. http://dx.doi.org/10.1787/9789264266490-en
[219] "Job Openings: Total Nonfarm," Federal Reserve Bank of St. Louis FRED, Web. January 2018. https://fred.stlouisfed.org/series/JTSJOL
[220] "Overview of Public and Private School Choice Option," Congressional Research Service, August 23, 2017. http://www.crs.gov/reports/pdf/IF10713
[221] "Public High School Graduation Rates," National Center for Educational Statistics, Published April 2017, Web January 2018. https://nces.ed.gov/programs/coe/indicator_coi.asp
[222] "The Fiscal Effect of Private-School Vouchers," Joint Economic Committee, December 5, 2017. https://www.jec.senate.gov/public/index.cfm/republicans/2017/12/the-fiscal-effect-of-private-school-vouchers
[223] "Estimated Charter Public School Enrollment, 2016-17," National Alliance For Public Charter Schools, p. 2, February 1, 2017. https://www.publiccharters.org/sites/default/files/migrated/wp-content/uploads/2017/01/EER_Report_V5.pdf
[224] "Digest of Education Statistics," National Center for Education Statistics, Table 216.20. https://nces.ed.gov/programs/digest/2017menu_tables.asp
[225] "50 State Comparison," Education Commission of the United States, October 2017. http://ecs.force.com/mbdata/mbquest4NE?rep=OE1705
[226] "The ABCs of School Choice: The comprehensive guide to every private school choice program in America," EdChoice, p. 7. https://www.edchoice.org/what-we-do/research/
[227] "A Win-Win Solution: The Empirical Evidence on School Choice," EdChoice, May 2016. https://www.edchoice.org/research/win-win-solution/
[228] EdChoice savings estimate through 2015, as of August 2017. Savings estimates are ongoing and a savings report through 2015 with final numbers is expected to be issued early in 2018.
[229] "Germany Offers a Promising Jobs Model," *Wall Street Journal*, September 8, 2016. https://www.wsj.com/articles/look-to-germany-for-a-winning-jobs-model-1473375942

[230] "College Enrollment and Work Activity of 2016 High School Graduates," Bureau of Labor Statistics, web February 16, 2018.
https://www.bls.gov/news.release/hsgec.nr0.htm

[231] Daniels, Mitchell E., "Financing Higher Education: Exploring Current Challenges and Potential Alternatives," Testimony before the Joint Economic Committee, September 30, 2015.
http://www.jec.senate.gov/public/index.cfm/hearings-calendar?ID=7C64D2C3-1A88-423F-86E0-D524721C4AE2

[232] JER 2017, pp. 110-111.

[233] "The Mounting Student-Loan Shortfall," Wall Street Journal, February 5, 2018.

[234] JER 2017, p. 112; and "Credit Supply and the Rise in College Tuition: Evidence from the Expansion in Federal Student Aid Programs," *Federal Reserve Bank of New York Staff Report*, Staff Report No. 733, July 2015 Revised October 2016.
https://www.newyorkfed.org/medialibrary/media/research/staff_reports/sr733.pdf

[235] "The Mounting Student-Loan Shortfall," Wall Street Journal, February 5, 2018.

[236] Harrison, David T., "A Record Six Million U.S. Job Vacancies: Reasons and Remedies," Testimony before the Joint Economic Committee, July 12, 2017. https://www.jec.senate.gov/public/index.cfm/2017/7/a-record-six-million-u-s-job-vacancies-reasons-and-remedies

[237] McLemore, Scot, "A Record Six Million U.S. Job Vacancies: Reasons and Remedies," Testimony before the Joint Economic Committee, July 12, 2017. https://www.jec.senate.gov/public/index.cfm/2017/7/a-record-six-million-u-s-job-vacancies-reasons-and-remedies

[238] Furchtgott-Roth, Diana, "A Record Six Million U.S. Job Vacancies: Reasons and Remedies," Testimony before the Joint Economic Committee, July 12, 2017. https://www.jec.senate.gov/public/index.cfm/2017/7/a-record-six-million-u-s-job-vacancies-reasons-and-remedies

[239] "With a Worker Shortage, It's Time to Develop America's Workforce," Speaker Ryan Press Office, February 22, 2018.
https://www.speaker.gov/general/worker-shortage-it-s-time-develop-america-s-workforce

[240] "Table 1-28: Condition of U.S. Highway Bridges," United States Department of Transportation, Bureau of Transportation Statistics.
https://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/national_transportation_statistics/html/table_01_28.html

[241] O'Toole, Randal, "The Truth About Infrastructure," U.S. News, March 24, 2015. https://www.usnews.com/opinion/economic-intelligence/2015/03/24/dont-raise-gas-tax-to-fix-supposed-infrastructure-crisis

[242] This was not always the case. In the early 1930s, about half the nation's 1,100 airports were private. See, Poole, Robert and Chris Edwards,

"Privatizing U.S. Airports," *Tax and Budget Bulletin*, Cato Institute, No. 76, November 2016.

[243] A closely related consideration is the relation of marginal cost to marginal benefit of additional users. On many roads the cost of another car travelling on them is low relative to the benefit the user and the surrounding communities derive. The tolls drivers are willing to pay will reflect wider benefits, but if the cost of collecting an individual toll is significant relative to the marginal cost of using a road and higher than the cost of tax collection, then the amount of the toll may dissuade a significant number of drivers who could derive a net benefit from using the road. The other side of this problem is the difficulty of excluding people who do not pay for the benefits they derive and that the marginal cost of their benefits may be small or zero. This is what technically makes something a "public good."

[244] There was a time when many countries had nationalized postal, telecommunications, and TV/radio broadcast services in one government entity (so-called PTTs).

[245] Leaving aside for the moment that the debt has to monetized by the central bank for inflation to rise.

[246] Howard, Phillip K., "The Rule of Nobody: Saving America from Dead Laws and Broken Government," *Norton*, 2014. The author cites many examples of excessively prescriptive rules that prevent the exercise of good judgment based on sound principles. Schuck, Peter H., "Why Government Fails So Often," Princeton University Press, 2014, is another study in unintended consequences.

[247] See "California's Bullet Train to Whenever," Review & Outlook, *The Wall Street Journal*, May 22, 2016.

[248] Lipson, Rachel and Lawrence H. Summers, "A Lesson on Infrastructure from the Anderson Bridge Fiasco," *The Boston Globe*, May 25, 2016. Summers also points out that in 55 BC it took Julius Caesar 10 days to build a bridge across the Rhine River that was six times longer.

[249] U.S. International Trade Commission, *Digital Trade in the U.S. and Global Economies, Part 2*, Publication No: 4485, Investigation No: 332-540, p.29, August 2014, The definition of digital commerce has been evolving. USITC prepared two reports (Parts 1 and 2) at the request of the U.S. Senate Committee on Finance. Part 1, published in 2013, used a narrower definition that only included products and services delivered over digital networks like an e-book delivered to a tablet, but excluded goods like a physical book ordered online via the same website (p. 13).

[250] "The Dynamic Gains From Free Digital Trade," Joint Economic Committee, September 12, 2017. https://www.jec.senate.gov/public/index.cfm/hearings-calendar?ID=EC4C2DC7-2CD9-4175-989C-B46E6DA9B74E

[251] "Digitally Deliverable Services Remain an Important Component of U.S. Trade," United States Department of Commerce, Economics & Statistics Administration, May 28, 2015. http://www.esa.doc.gov/economic-briefings/digitally-deliverable-services-remain-important-component-us-trade

[252] Bughin, Jacques et al., "Digital globalization: The new era of global flows," McKinsey Global Institute, pp. 41, 57, February, 2016. https://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/digital-globalization-the-new-era-of-global-flows

[253] Ibid, p. 13-14 for summary statistics.

[254] McKinsey, p. 10.

[255] McKinsey, p. 23.

[256] McKinsey, p. 30.

[257] "The Economic Outlook with CEA Chairman Kevin Hassett," Joint Economic Committee, October 25, 2017. https://www.jec.senate.gov/public/index.cfm/hearings-calendar?ID=E29B5AC2-01AF-4C3D-B774-DCCB1A4B5D2C

[258] Application of Communications Act Title II regulation by the Obama FCC's threatened to end that tradition. The current FCC chairman does not intend to regulate the internet more stringently.

[259] "The WTO Work Programme on electronic commerce," White & Case LLP, March 13, 2015. https://www.lexology.com/library/detail.aspx?g=a1770783-f8a5-4128-8020-60368b794044

[260] For the full list, see, United States Trade Representative, "Fact Sheet: Key Barriers to Digital Trade"

[261] Heather, Sean, "The Dynamic Gains from Free Digital Trade for the U.S. Economy," Testimony before the Joint Economic Committee, p.3, September 12, 2017. https://www.jec.senate.gov/public/_cache/files/6eefe32e-6e2d-477c-bc44-c26bf4756df8/testimony-digital-trade-joint-economic-committee-sean-heather-09082017.pdf

[262] The United States, the EU, and Switzerland are parties to Privacy Shield programs that provide companies with a mechanism to comply with data protection requirements when transferring personal data to the United States in support of transatlantic commerce. The Privacy Shield program is administered by the International Trade Administration (ITA) of the Commerce Department. To join, a U.S.-based organization must self-certify to the Commerce Department and publicly commit that it will adhere to the Framework's requirements. Joining the Privacy Shield is voluntary, but the commitment to comply is enforceable under U.S. law.

[263] The high end of the ranges is more realistic because that assumes the U.S. labor supply increases when wages rise whereas the low end does not. USITC, *Digital Trade in the U.S. and Global Economies, Part 2*, p. 19, August 2014.

[264] Spire Research and Consulting conducted the study and estimated the economic impact of full liberalization of cross-border ICT services and rules globally. It examines a group of eight globally important markets, including Brazil, the European Union, Indonesia, Japan, Korea, Nigeria, Turkey, and Vietnam, February 22, 2017.

[265] "Korean-United States Free Trade Agreement (KORUS)," Office of the United States Trade Representative. https://ustr.gov/trade-agreements/free-trade-agreements/korus-fta/final-text

[266] H.R. 2146, 114th Congress.

[267] H.R. 1890, 114th Congress.

[268] See summary of TPP digital trade provisions in Appendix, from USTR "TPP: Promoting Digital Trade."

[269] Paulsen, Erik, "Paulsen, DelBene Launch Bipartisan Digital Trade Caucus," Congressman Erik Paulsen, May 1, 2017. https://paulsen.house.gov/press-releases/paulsen-delbene-launch-bipartisan-digital-trade-caucus/

[270] Dean, David et al., "Greasing the Wheels of the Internet Economy," The Boston Consulting Group, January 2014. https://www.icann.org/en/system/files/files/bcg-internet-economy-27jan14-en.pdf

[271] Dean, David et al., "The Internet Economy in the G-20: The $4.2 Trillion Growth Opportunity," The Boston Consulting Group, p. 50, March 2012. https://www.bcg.com/publications/2012/technology-digital-technology-planning-internet-economy-g20-4-2-trillion-opportunity.aspx

[272] Bughin, Jacques et al., "Internet Matters: The Net's sweeping impact on growth, jobs, and prosperity," McKinsey Global Institute, May 2011. https://www.mckinsey.com/industries/high-tech/our-insights/internet-matters

[273] "Enabling Traders to Enter and Grow on the Global Stage," eBay. https://www.ebaymainstreet.com/sites/default/files/eBay_Enabling-Traders-to-Enter-and-Grow-on-the-Global-Stage.pdf

[274] Patel Goyal, Kruti, "International Update", Etsy News, October 15, 2012. https://blog.etsy.com/news/2012/international-update/

[275] "Blockchain's Medical Potential," Joint Economic Committee Republicans, August 31, 2017. https://www.jec.senate.gov/public/_cache/files/30302566-d457-469e-9f9d-e4693288334a/blockchain-medical-potential.pdf

[276] Everyday objects enabled to send and receive data and interconnected via the internet.

[277] Evans, Dave, "The Internet of Things: How the Next Evolution of the Internet is Changing Everything," Cisco, April 2011. https://www.cisco.com/c/dam/en_us/about/ac79/docs/innov/IoT_IBSG_0411FINAL.pdf

[278] 567 U.S. 519, 2012.

[279] "Key Features of the Affordable Care Act By Year," Health and Human Services (HHS). https://www.hhs.gov/healthcare/facts-and-features/key-features-of-aca-by-year/index.html#2014

[280] "10 Health Care Benefits Covered in Health Insurance Marketplace," HHS, *Healthcare.gov*, August 22, 2013. https://www.healthcare.gov/blog/10-health-care-benefits-covered-in-the-health-insurance-marketplace/

[281] Crawford, Jan, "Policy Cancellations, Higher Premiums Add to Frustration Over Obamacare," CBS News, October 30, 2013. http://www.cbsnews.com/news/policy-cancellations-higher-premiums-add-to-frustration-over-obamacare/

See Also: Myers, Lisa and Hannah Rappleye, "Obama Administration Knew Millions Could Not Keep Their Health Insurance," NBC News, October 29, 2013. http://www.nbcnews.com/news/other/obama-administration-knew-millions-could-not-keep-their-health-insurance-f8C11485678

[282] Drobnic Holan, Angie, "Lie of the Year: 'If You Like Your Health Care Plan, You Can Keep It,'" Politifact, December 12, 2013. http://www.politifact.com/truth-o-meter/article/2013/dec/12/lie-year-if-you-like-your-health-care-plan-keep-it/

[283] Garfield, Rachel and Anthony Damico, "The Coverage Gap: Uninsured Poor Adults in States that Do Not Expand Medicaid," Kaiser Family Foundation, October 19, 2016. http://kff.org/uninsured/issue-brief/the-coverage-gap-uninsured-poor-adults-in-states-that-do-not-expand-medicaid/

[284] "If you don't have health insurance: How much you'll pay," HHS, Healthcare.gov. https://www.healthcare.gov/fees/fee-for-not-being-covered/

[285] "Individual Market Premium Changes: 2013 – 2017," HHS, May 23, 2017. https://aspe.hhs.gov/system/files/pdf/256751/IndividualMarketPremiumChanges.pdf.

[286] "Health Plan Choice and Premiums in the 2018 Federal Health Insurance Exchange," HHS, October 2017. https://aspe.hhs.gov/system/files/pdf/258456/Landscape_Master2018_1.pdf.

[287] Call, Adrienne et al., "Changes in Consumer Cost-Sharing for Health Plans Sold in the ACA's Insurance Marketplaces, 2015 to 2016," The Commonwealth Fund, May 2016. http://www.commonwealthfund.org/publications/issue-briefs/2016/may/cost-sharing-increases

[288] "Health Plan Choice and Premiums in the 2018 Federal Health Insurance Exchange," HHS, October 2017. https://aspe.hhs.gov/system/files/pdf/258456/Landscape_Master2018_1.pdf

[289] Claxton, Gary et al., "The Numbers Behind "Young Invincibles" and the Affordable Care Act," Kaiser Family Foundation (KFF), December 17, 2013. http://kff.org/health-reform/perspective/the-numbers-behind-young-invincibles-and-the-affordable-care-act/

[290]Foster, Richard S., "Estimated Financial Effects of the 'Patient Protection and Affordable Care Act,' as Amended," CMS, April 22, 2010. https://www.cms.gov/Research-Statistics-Data-and-Systems/Research/ActuarialStudies/downloads/ppaca_2010-04-22.pdf

[291] "CBO's Record of Projecting Subsidies for Health Insurance Under the Affordable Care Act: 2014 to 2016," Congressional Budget Office, December 7, 2017. https://www.cbo.gov/publication/53094

[292] "Final Weekly Enrollment Snapshot For 2018 Open Enrollment Period," Centers for Medicare and Medicaid Services (CMS), December 28, 2017. https://www.cms.gov/Newsroom/MediaReleaseDatabase/Fact-sheets/2017-Fact-Sheet-items/2017-12-28.html

[293] CMS data found at https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/NationalHealthAccountsProjected.html

[294] Sawyer, Bradley and Cynthia Cox, "How does health spending in the U.S. compare to other countries?" Peterson-Kasier Health System Tracker, February 13, 2018. https://www.healthsystemtracker.org/chart-collection/health-spending-u-s-compare-countries/?_sf_s=health+spending#item-u-s-similar-public-spending-private-sector-spending-triple-comparable-countries

[295] Baicker, Katherine and Jonathan S. Skinner, "Health Care Spending Growth and the Future of U.S. Tax Rates," January 1, 2012. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3197707/

[296] "No family making less than $250,000 will see 'any form of tax increase'," Politifact, https://goo.gl/W0Wqo5

[297] "CBO/JCT Confirm that Obamacare is a $1 Trillion Tax Hike," House of Representatives Ways and Means Committee, July 25, 2012. https://waysandmeans.house.gov/cbojct-confirm-that-obamacare-is-a-1-trillion-tax-hike/

[298] "Hearing to Consider the Anticipated Nomination of [Mnuchin] to be Secretary of the Treasury," Senate Finance Committee, January 19, 2017. https://goo.gl/QXRcgC

[299] Zycher, Benjamin, "ObamaCare's Tax on Medical Devices: Cuts R&D by $2 Billion a Year," Pacific Research Institute, May 2012.

[300] Hoghaug, Thomas A., "Small Business, Big Taxes: Are Taxes Holding Back Small Businees Growth?" Testimony before the Joint Economic Committee, April 15, 2015. https://www.jec.senate.gov/public/_cache/files/2dd5b3a8-1f36-4af1-ab34-47594253a802/hoghaug-testimony.pdf

[301] For example, see Berger, Judson, "Company's decision to nix expansion over ObamaCare tax renews pressure on Congress," Fox News, July 30, 2012. http://www.foxnews.com/politics/2012/07/30/company-decision-to-nix-expansion-over-obamacare-tax-renews-pressure- https://www.congress.gov/bill/115th-congress/house-bill/184?q=%7B%22search%22%3A%22medical+device%22%7D&r=4on.html

[302] Annual Survey of Manufacturers, Statistics for Industry Groups and Industries, U.S. Census Bureau, Economics and Statistics Administration, U.S. Department of Commerce, at http://www.census.gov/programs-surveys/asm.html

[303] Book, Robert, "Employment Effects Of the Medical Device Tax," American Action Forum, March 2, 2017. https://www.americanactionforum.org/research/employment-effects-medical-device-tax/

[304] "Medical Device Tax," Advanced Medical Technology Association. https://www.advamed.org/RepealDeviceTax

[305] See H.R. 184, 115th Congress. https://www.congress.gov/bill/115th-congress/house-bill/184?q=%7B%22search%22%3A%22medical+device%22%7D&r=4

[306] For discussion of medical technology export opportunities, see "2016 Top Markets Report – Medical Devices," International Trade Administration, Department of Commerce, May 2016. https://www.trade.gov/topmarkets/pdf/Medical_Devices_Top_Markets_Report.pdf

[307] Hosek, Susan D. et al., "The Elasticity of Demand for Health Care," Rand Health. http://www.rand.org/content/dam/rand/pubs/monograph_reports/2005/MR1355.pdf

[308] Greenberg, Scott, "Five Years Later: ACA's Branded Prescription Drug Fee May Have Contributed to Rising Drug Prices," Tax Foundation, June 17, 2015. https://taxfoundation.org/five-years-later-aca-s-branded-prescription-drug-fee-may-have-contributed-rising-drug-prices/

[309] "Retiree Prescription Drug Subsidy: Background on Subsidy Amount and Taxation," American Benefits Council, January 10, 2010. https://www.americanbenefitscouncil.org/pub/?id=e60986e7-903b-9917-e8dc-6de90861b0e4

[310] Miller, Stephen, "Health Reform Forces Taxing Decision on Retiree Drug Plans," Society for Human Resource Management, March 26, 2010. https://www.shrm.org/hr-today/news/hr-news/pages/taxingretireedrugs.aspx

[311] Miller, Thomas P., "Examining the Effectiveness of the Individual Mandate under the Affordable Care Act," American Enterprise Institute, January 24, 2017. https://waysandmeans.house.gov/wp-content/uploads/2017/01/20170124-OS-Testimony-Miller.pdf

[312] Miller, Tom, "A hidden tax in Obamacare," *Los Angeles Times*, May 31, 2013. http://articles.latimes.com/2013/may/31/opinion/la-oe-miller-obamacare-seniors-tax-20130531

[313] Walsh, Brendan, "How Obamacare Raises Healthcare Costs for Special Needs Children," Americans for Tax Reform, September 13, 2013. https://www.atr.org/obamacare-raises-healthcare-costs-special-needs-a7858

[314] "IRS Issues Guidance Explaining 2011 Changes to Flexible Spending Arrangements," Internal Revenue Service, September 3, 2010. https://www.irs.gov/newsroom/irs-issues-guidance-explaining-2011-changes-to-flexible-spending-arrangements

[315] See line item for "ACA taxes" on sample premium bill at https://uhahealth.com/uploads/forms/sample_Premium-Billing.pdf

[316] See JCT letter to Senator Kyl posted at http://www.stopthehit.com/sites/default/files/files/JCT%20Report.pdf

[317] Public Law 115-120; summary found at https://www.congress.gov/bill/115th-congress/house-bill/195?q=%7B%22search%22%3A%5B%22Extension+of+Continuing+Appropriations+Act+of+2018%22%5D%7D&r=3

[318] "Employer Shared Responsibility Provisions," Internal Revenue Service. https://www.irs.gov/affordable-care-act/employers/employer-shared-responsibility-provisions

[319] For example, see Graham, Jed, "ObamaCare Employer Mandate: A List Of Cuts To Work Hours, Jobs," Investor's Business Daily, September 5, 2014. http://www.investors.com/obamacare-employer-mandate-a-list-of-cuts-to-work-hours-jobs/

[320] "Employer Mandate," U.S. Chamber of Commerce. https://www.uschamber.com/health-reform/employer-mandate.

[321] For example, see Sergio, Joseph P., "Examining the Employment Effects of the Affordable Care Act," Testimony before the Joint Economic Committee, June 3, 2015. https://www.jec.senate.gov/public/_cache/files/53079a8d-acd2-4a8a-be53-9f919e7e81b0/sergio-testimony.pdf

[322] Mulligan, Casey B., "How Many Jobs Does ObamaCare Kill?" *Wall Street Journal*, July 5, 2017. https://www.wsj.com/articles/how-many-jobs-does-obamacare-kill-1499296604

[323] "Cadillac Tax Fact Sheet," Cigna. https://www.cigna.com/assets/docs/about-cigna/informed-on-reform/882320-a-cadillac-tax-sheet.pdf

[324] Lemieux, Jeff and Chad Moutray, "About That Cadillac Tax," Health Affairs, April 25, 2016. http://healthaffairs.org/blog/2016/04/25/about-that-cadillac-tax/

[325] *Ibid.*

[326] "Present Law and Background Regarding the Federal Income Taxation of Small Business," Public Hearing before the Tax Policy Subcommittee of the House of Representatives Committee on Ways and Means, July 13, 2017. https://www.jct.gov/publications.html?func=startdown&id=5006

[327] DeBacker, Jason et al., "Methodology to Identify Small Businesses and Their Owners," Office of Tax Analysis, Department of the Treasury, August 2011. https://www.treasury.gov/resource-center/tax-policy/tax-analysis/Documents/TP-4.pdf

[328] Harris, Edward and Shannon Mok, "How CBO Estimates the Effects of the Affordable Care Act on the Labor Market," Congressional Budget Office, p. 14, December 2015. https://www.cbo.gov/sites/default/files/114th-congress-2015-2016/workingpaper/51065-acalabormarketeffectswp.pdf

[329] Memorandum from the Joint Committee on Taxation, May 4, 2010. https://www.jec.senate.gov/public/_cache/files/01be31b4-f000-4c37-b26b-5286b9782d25/revenue-estimate-050410.pdf

[330] "Factors Affecting the Labor Force Participation of People Ages 25 to 54," Congressional Budget Office, February 7, 2018. https://www.cbo.gov/publication/53452

[331] "Factors Affecting the Labor Force Participation of People Ages 25 to 54," Congressional Budget Office, p. 18, February 7, 2018. https://www.cbo.gov/system/files/115th-congress-2017-2018/reports/53452-lfpr.pdf

[332] "Effective Marginal Tax Rates for Low- and Moderate-Income Workers in 2016," Congressional Budget Office, p. 8, November 19, 2015. https://www.cbo.gov/publication/50923

[333] Harris, Edward and Shannon Mok, "How CBO Estimates the Effects of the Affordable Care Act on the Labor Market," Congressional Budget Office, p. 14, December 2015. https://www.cbo.gov/sites/default/files/114th-congress-2015-2016/workingpaper/51065-acalabormarketeffectswp.pdf

[334] Mulligan, Casey B., "Examining the Employment Effects of the Affordable Care Act," Testimony before the Joint Economic Committee, p. 9, June 3, 2015. https://www.jec.senate.gov/public/_cache/files/d0d17590-6762-4af0-b508-95c0ed6b0a82/mulligan-testimony.pdf

[335] Mulligan testimony, p. 11.

[336] Mulligan testimony, p. 16.

[337] "CBO's Record of Projecting Subsidies for Health Insurance Under the Affordable Care Act: 2014 to 2016," Congressional Budget Office, December 7, 2017. https://www.cbo.gov/publication/53094

[338] ERP 2018, p. 280.

[339] ERP 2018, p. 281.

[340] *Ibid.*

[341] ERP 2018, pp. 292-299.

[342] ERP 2018, p. 321.

[343] "Drug Overdose Death Data," Center for Disease Control, Web February 8, 2018. https://www.cdc.gov/drugoverdose/data/statedeaths.html

[344] "The Underestimated Cost of the Opioid Crisis," The Council of Economic Advisors, November 2017. https://www.whitehouse.gov/sites/whitehouse.gov/files/images/The%20Underestimated%20Cost%20of%20the%20Opioid%20Crisis.pdf

[345] "Economic Aspects of the Opioid Crisis," Joint Economic Committee, June 8, 2017. https://www.jec.senate.gov/public/index.cfm/republicans/2017/6/the-opioid-crisis

[346] "Economic Aspects of the Opioid Crisis," Joint Economic Committee, June 8, 2017. https://www.jec.senate.gov/public/index.cfm/republicans/2017/6/the-opioid-crisis

[347] O'Connor, Sean, "Fentanyl: China's Deadly Export to the United States," U.S.-China Economic and Security Review Commission, February 1, 2017. https://www.uscc.gov/sites/default/files/Research/USCC%20Staff%20Report_Fentanyl-China%E2%80%99s%20Deadly%20Export%20to%20the%20United%20States020117.pdf

[348] "Counterfeit Prescription Pills Containing Fentanyls: A Global Threat," Drug Enforcement Agency, July 2016. https://www.dea.gov/docs/Counterfeit%20Prescription%20Pills.pdf

[349] "Prescription Drugs OxyContin Abuse and Diversion and Efforts to Address the Problem," United States General Accounting Office, December 2003. http://www.gao.gov/new.items/d04110.pdf

[350] Gregory, Sean, "How Obamacare is Fueling America's Opioid Epidemic," *Time*, April 13, 2016. http://time.com/4292290/how-obamacare-is-fueling-americas-opioid-epidemic/

[351] "Prescription Opioid Overdose Data," Centers for Disease Control and Prevention. https://www.cdc.gov/drugoverdose/data/overdose.html

[352] "Prescription Opioids and Heroin," National Institute on Drug Abuse. https://www.drugabuse.gov/publications/research-reports/relationship-between-prescription-drug-heroin-abuse/prescription-opioid-use-risk-factor-heroin-use

[353] Krueger, Alan B., "Where have all the workers gone? An inquiry into the decline of the U.S. labor force participation rate," Brookings Paper on Economic Activity, September 7, 2017. https://www.brookings.edu/bpea-articles/where-have-all-the-workers-gone-an-inquiry-into-the-decline-of-the-u-s-labor-force-participation-rate/

[354] "Annual Surveillance Report of Drug-Related Risks and Outcomes United States, 2017," Center for Disease Control, August 31, 2017. https://www.cdc.gov/drugoverdose/pdf/pubs/2017-cdc-drug-surveillance-report.pdf

[355] "Characteristics of Initial Prescription Episodes and Likelihood of Long-Term Opioid Use — United States, 2006–2015," Center for Disease Control, March 17, 2017. https://www.cdc.gov/mmwr/volumes/66/wr/mm6610a1.htm

[356] Case, Anne, and Angus Deaton, "Mortality and morbidity in the 21st century," Brookings Papers on Economic Activity (2017). https://www.brookings.edu/bpea-articles/mortality-and-morbidity-in-the-21st-century/

[357] "Prescription Drugs OxyContin Abuse and Diversion and Efforts to Address the Problem," United States General Accounting Office, pp. 2, 9, 10, December 2003. http://www.gao.gov/new.items/d04110.pdf

[358] Hollingsworth, Alex et al., "Macroeconomic Conditions and Opioid Abuse," National Bureau of Economic Research, No. w23192, February 2017 revised March 2017. http://www.nber.org/papers/w23192.pdf

[359] "Prescription Drugs OxyContin Abuse and Diversion and Efforts to Address the Problem," United States General Accounting Office, pp. 20, 31, December 2003. http://www.gao.gov/new.items/d04110.pdf

[360] Dowell, Deborah et al., "Payments for Opioids Shifted Substantially to Public and Private Insurers While Consumer Spending Declined, 1999-2012," *Health Affairs* 35 (5), pp. 824-831. https://www.healthaffairs.org/doi/full/10.1377/hlthaff.2015.1103. Also see Eberstadt, Nicholas, "Our Miserable 21st century," *Commentary*, February 2017. https://www.commentarymagazine.com/articles/our-miserable-21st-century/

[361] Sam Quinones *Dreamland* chronicles the development of the black tar heroin market from Mexico to Columbus, Ohio.

[362] Hearing recording available at https://www.jec.senate.gov/public/index.cfm/hearings-calendar?ID=352D21CA-477D-4582-BE82-734CB29A520A.

[363] "2016 National Drug Threat Assessment Summary," Drug Enforcement Administration, p. 65, November 2016. https://www.hsdl.org/?view&did=797265

[364] "Economic Aspects of the Opioid Crisis," Joint Economic Committee, June 8, 2017. https://www.jec.senate.gov/public/index.cfm/republicans/2017/6/the-opioid-crisis

[365] "2016 National Drug Threat Assessment Summary," Drug Enforcement Administration, p. 65, November 2016. https://www.hsdl.org/?view&did=797265

[366] "NFLIS Brief: Fentanyl, 2001-2015," National Forensic Laboratory Information System, March 2017. https://www.deadiversion.usdoj.gov/nflis/2017fentanyl.pdf

[367] "Drug Overdose Deaths in the United States, 1999-2016," National Center for Health Statistics, December 2017. https://www.cdc.gov/nchs/data/databriefs/db294.pdf

[368] "Hiring Hurdle: Finding Workers Who Can Pass a Drug Test," *New York Times,* May 17, 2016. https://www.nytimes.com/2016/05/18/business/hiring-hurdle-finding-workers-who-can-pass-a-drug-test.html?_r=0

[369] Lazear, Edward and James Spletzer, "Hiring, Churn, and the Business Cycle," *The American Economic Review* 102 (3) (2012), pp. 575-579.

[370] Whalen, Jeanne, "The Children of the Opioid Crisis," *Wall Street Journal*, December 15, 2016. https://www.wsj.com/articles/the-children-of-the-opioid-crisis-1481816178

[371] The National Data Archive on Child Abuse and Neglect. https://www.ndacan.cornell.edu/datasets/datasets-list-afcars-foster-care.cfm

[372] Barfield, Wanda D. et al., "Incidence of Neonatal Abstinence Syndrome — 28 States, 1999–2013," Center for Disease Control, August 12, 2016. https://www.cdc.gov/mmwr/volumes/65/wr/mm6531a2.htm

[373] Young, Nancy, K., "Examining the Opioid Epidemic: Challenges and Opportunities," Testimony before the United States Senate Committee on Finance, Tuesday, February 23, 2016. https://www.finance.senate.gov/imo/media/doc/23feb2016Young.pdf

[374] Barfield, Wanda D. et al., "Incidence of Neonatal Abstinence Syndrome — 28 States, 1999–2013," Center for Disease Control, August 12, 2016. https://www.cdc.gov/mmwr/volumes/65/wr/mm6531a2.htm

[375] Murgia, Madhumita, "Mapping out the causes of suicide in teenagers and children," *The Washington Post*, Auguat 22, 2017. https://www.washingtonpost.com/national/health-science/mapping-out-the-causes-of-suicide-in-teenagers-and-children/2017/08/22/c146cc6c-770e-11e7-8839-ec48ec4cae25_story.html?utm_term=.3a2f202f046e

[376] Florence, C. S. et al., "The Economic Burden of Prescription Opioid Overdose, Abuse, and Dependence in the United States, 2013," National Institute of Health U.S. National Library of Medicine, October, 2016. https://www.ncbi.nlm.nih.gov/pubmed/27623005

[377] "The Underestimated Cost of the Opioid Crisis," The Council of Economic Advisors, November 2017. https://www.whitehouse.gov/sites/whitehouse.gov/files/images/The%20Underestimated%20Cost%20of%20the%20Opioid%20Crisis.pdf; one methodology for estimating the value of a statistical life is

https://www.bls.gov/opub/mlr/2013/article/using-data-from-the-census-of-fatal-occupational-injuries-to-estimate-the.htm.

[378] Brill, Alex, "New state-level estimates of the economic burden of the opioid epidemic," American Enterprise Institute, January 16, 2018. http://www.aei.org/publication/new-state-level-estimates-of-the-economic-burden-of-the-opioid-epidemic/

[379] For example, see Welker, Grant, "Boston Scientific receives FDA approval for non-opioid painkiller," Worcester Business Journal, January 11, 2018. http://www.wbjournal.com/article/20180111/NEWS01/180119981/boston-scientific-receives-fda-approval-for-non-opioid-painkiller

[380] Vimont, Celia, "New Drug Deactivation System Allows Patients to Safely Dispose of Opioids at Home," Partnership for Drug-Free Kids, July 13, 2016. https://drugfree.org/learn/drug-and-alcohol-news/new-drug-deactivation-system-allows-patients-safely-dispose-opioids-home/

[381] ERP 2018, Box 6-2, pp. 296-297.

[382] "A Record Six Million U.S. Job Vacancies: Reasons and Remedies," Joint Economic Committee, July 12, 2017. https://www.jec.senate.gov/public/index.cfm/2017/7/a-record-six-million-u-s-job-vacancies-reasons-and-remedies .

[383] "Economic Aspects of the Opioid Crisis," Joint Economic Committee, June 8, 2017. https://www.jec.senate.gov/public/index.cfm/republicans/2017/6/the-opioid-crisis

[384] H.R. 1628, 115th Congress (engrossed version).

[385] "Congressional Budget Office – Cost Estimate: American Health Care Act of 2017," Congressional Budget Office, p. 6, May 24, 2017. https://www.cbo.gov/system/files/115th-congress-2017-2018/costestimate/hr1628aspassed.pdf

[386] CBO analysis of AHCA, Table 1.

[387] See individual provisions contained in Title I and Title II of AHCA.

[388] See CMS letter to State Medicaid Directors at https://www.medicaid.gov/federal-policy-guidance/downloads/smd18002.pdf.

[389] "U.S. Department of Labor Announces Proposal to Expand Access to Healthcare Through Small Business Health Plans," Department of Labor, January 4, 2018. https://www.dol.gov/newsroom/releases/ebsa/ebsa20180104

[390] "Fact Sheet: Short-Term, Limited-Duration Insurance Proposed Rule," CMS, February 20, 2018. https://www.cms.gov/Newsroom/MediaReleaseDatabase/Fact-sheets/2018-Fact-sheets-items/2018-02-20.html.

[391] "Chronic Diseases: The Leading Causes of Death and Disability in the United States," Centers for Disease Control and Prevention. https://www.cdc.gov/chronicdisease/overview/index.htm

[392] *Ibid.*

[393] "Multiple Chronic Conditions," Centers for Disease Control and Prevention. https://www.cdc.gov/chronicdisease/about/multiple-chronic.htm.

[394] Paulsen, Erik, "Paulsen, Welch Introduce Legislation to Improve Chronic Care, Lower Costs for Patients," Congressman Erik Paulsen, March 24, 2016.

https://paulsen.house.gov/press-releases/paulsen-welch-introduce-legislation-to-improve-chronic-care-lower-costs-for-patients/

[395] ERP 2018, p. 290.

[396] "Background: The American Medical Technology Industry and International Competitiveness," Advanced Medical Technology Association, August 15, 2011. https://www.advamed.org/sites/default/files/resource/32_10_2011_Final_Study_CAgenda_Backgrounder.pdf.

[397] ERP 2018, Box 6-4, p. 306.

[398] *Ibid.*

[399] "A Better Way: Our Vision for a Confident America, Health Care," Speaker Paul Ryan, pp 28-29, June 22, 2016. https://abetterway.speaker.gov/_assets/pdf/ABetterWay-HealthCare-PolicyPaper.pdf

[400] ERP 2018, p. 314.

[401] ERP 2018, p. 307.

[402] Pomerleau, "Analysis of the 2016 House Republican Tax Plan."

[403] "Year in Search 2017," Google, https://trends.google.com/trends/yis/2017/GLOBAL/

[404] Data from the Federal Reserve Economic Data (FRED), Federal Reserve Bank of St. Louis: Dow Jones Industrial Average: https://fred.stlouisfed.org/series/DJIA, S&P 500: https://fred.stlouisfed.org/series/SP500

[405] Data from CoinDesk: Bitcoin: https://www.coindesk.com/price/, Ethereum: https://www.coindesk.com/ethereum-price/

[406] http://www.businessinsider.com/where-are-the-kings-of-the-1990s-dot-com-bubble-bust-2016-12

[407] Yahoo Finance Data, https://finance.yahoo.com/quote/AMZN?p=AMZN

[408] Data from CoinMarket Cap: https://coinmarketcap.com/coins/

[409] Catalini, Christian and Joshua Gans, "Some Simple Economics of the Blockchain," NBER Working Paper 22952, http://www.nber.org/papers/w22952

[410] Buterin, Vitalik, "What is Ethereum?", Coin Center, March 9, 2016, https://coincenter.org/entry/what-is-ethereum

[411] "What is Either?", Ethereum Project, https://www.ethereum.org/ether

[412] Lee, Timothy, "Bitcoin's insane energy consumption, explained," Ars Technica, December 6, 2017, https://arstechnica.com/tech-policy/2017/12/bitcoins-insane-energy-consumption-explained/

[413] There is another method called proof of stake, but due to space constraints it is not discussed here.

[414] Van Valkenburgh, Peter, "What is Bitcoin Mining, and Why is it Necessary?" Coin Center, December 15, 2014, https://coincenter.org/entry/what-is-bitcoin-mining-and-why-is-it-necessary

[415] Mankiw, N. Gregory, "Principles of Macroeconomics, Fifth Edition," Cengage Learning, 2008, p. 338-341

[416] Torres, Craig, "Yellen Says Bitcoin Is a 'Highly Speculative Asset'," Bloomberg Technology, December 13, 2017, https://www.bloomberg.com/news/articles/2017-12-13/yellen-says-cryptocurrency-bitcoin-is-highly-speculative-asset

[417] Browne, Ryan, "Big transaction fees are a problem for bitcoin – but there could be a solution," CNBC, December 19, 2017, https://www.cnbc.com/2017/12/19/big-transactions-fees-are-a-problem-for-bitcoin.html

[418] O'Leary, Rachel Rose, "Ethereum Executes Byzantium Blockchain Software Upgrade," CoinDesk, October 16, 2017, https://www.coindesk.com/ethereum-executes-blockchain-hard-fork-byzantium/

[419] Price, Rob, "Someone in 2010 bought 2 pizzas with 10,000 bitcoins – which today would be worth $100 million," Business Insider, November 28, 2017, http://www.businessinsider.com/bitcoin-pizza-10000-100-million-2017-11, ironically this process usually happens the other way with fiat currencies as central banks inflate away their value during crises (see Venezuela and Zimbabwe for modern examples)

[420] "Tech Visionary George Gilder: 'Bitcoin is the Libertarian Solution to the Money Enigma'," ReasonTV, August 14, 2014, https://www.youtube.com/watch?v=V9hb0EKAcro

[421] Brito, Jerry and Andrea Castillo, "Bitcoin: A Primer for Policymakers 2nd edition," Mercatus Center, 2016 https://coincenter.org/wp-content/uploads/2013/08/Bitcoin-Primer-2ndEd.pdf, p. 9

[422] Buterin, Vitalik, "Let's talk about the projected coin supply over the coming years," Reddit, https://www.reddit.com/r/ethereum/comments/5izcf5/lets_talk_about_the_projected_coin_supply_over/dbc66rd/

[423] Although "hard forks" could arguably increase the supply of a cryptocurrency. The nature of a hard fork creates a separate currency all to its own. For example, Bitcoin will only have 21 million tokens and the fact that Bitcoin Cash exists and shares part of the Bitcoin blockchain does not change that.

[424] Zerpa, Fabiola, "Venezuelan Hyperinflation Explodes, Soaring Over 440,000 Percent," Bloomberg, January 18, 2018, https://www.bloomberg.com/news/articles/2018-01-18/venezuelan-hyperinflation-explodes-soaring-over-440-000-percent

[425] Can't you feel the creativity?

[426] "Considering an IPO to fuel your company's future?", PriceWaterhouseCoopers, https://www.pwc.com/us/en/deals/publications/cost-of-an-ipo.html

[427] Grincalaitis, Merunas, "What it takes to create a successful ICO? How expensive it is? Your complete guide," Medium, September 29, 2017, https://medium.com/@merunasgrincalaitis/what-it-takes-to-create-a-successful-ico-how-expensive-it-is-your-complete-guide-35912722351e

[428] For podcast: Joint Economic Committee Republicans, "Main Street Economics" August 17, 2017: https://www.jec.senate.gov/public/index.cfm/republicans/podcasts/, For example, Miliard, Mike, "How does blockchain actually work for healthcare?", Healthcare IT News, April 13, 2017, http://www.healthcareitnews.com/news/how-does-blockchain-actually-work-healthcare

[429] Joint Economic Committee Republicans, "Main Street Economics" August 17, 2017: https://www.jec.senate.gov/public/index.cfm/republicans/podcasts/

[430] Healthnexus, https://token.simplyvitalhealth.com/

[431] Robomed Network, https://robomed.io/

[432] MediLedger, https://www.mediledger.com/

[433] BlockMedx, http://blockmedx.com/index.html

[434] O'Leary, Rachel Rose, "Congressional Group Pushes for Blockchain Security Standards," CoinDesk, August 22, 2017, https://www.coindesk.com/congressional-blockchain-group-pushes-medical-security-standards/

[435] "Announcing the Blockchain Challenge," HealthIT.gov, https://www.healthit.gov/newsroom/blockchain-challenge

[436] For more details see, "Blockchain Healthcare & Policy Synopsis," Chamber of Digital Commerce, October 2016, https://digitalchamber.org/assets/blockchain_healthcare_policy_synopsis_chamber_2016.pdf, and "Winners Announced!" CCC Innovation Center, http://www.cccinnovationcenter.com/challenges/block-chain-challenge/view-winners/

[437] Bruno, Debra, "Brooklyn's Latest Craze: Making Your Own Electric Grid," Politico, June 15, 2017, https://www.politico.com/magazine/story/2017/06/15/how-a-street-in-brooklyn-is-changing-the-energy-grid-215268

[438] For Australia: Sundararajan, Sujha, "Australian Government Grants $8 Million for Blockchain Energy Pilot," CoinDesk, November 20, 2017, https://www.coindesk.com/australian-government-grants-8-million-for-blockchain-energy-pilot/, For Europe: Milano, Annaliese, "European Energy Firms Trial Blockchain Trading Marketplace," CoinDesk, October 26, 2017, https://www.coindesk.com/european-energy-firms-trial-blockchain-trading-marketplace/, For Japan: del Castillo, Michael, "No More Nuclear: Japan's Biggest Utility Turns to Blockchain in Power Pivot," CoinDesk, October 10, 2017, https://www.coindesk.com/no-nuclear-japans-biggest-utility-turns-blockchain-power-pivot/

[439] "BlockCypher And U.S. Department Of Energy's National Renewable Energy Laboratory To Provide Blockchain Agnostic Distributed Energy Solution," January 23, 2018, http://www.prweb.com/releases/2018/01/prweb15117801.htm

[440] Cuomo, Gennaro, Testimony before the United States House Committee on Science, Space and Technology, Subcommittee on Oversight & Subcommittee on Research and Technology on "Beyond Bitcoin: Emerging Applications for

Blockchain Technology," February 14, 2018,
http://docs.house.gov/meetings/SY/SY21/20180214/106862/HHRG-115-SY21-Wstate-CuomoG-20180214.pdf, p. 3

[441] Yiannas, Frank, Testimony before the United States House Committee on Science, Space and Technology, Subcommittee on Oversight & Subcommittee on Research and Technology on "Beyond Bitcoin: Emerging Applications for Blockchain Technology," February 14, 2018,
http://docs.house.gov/meetings/SY/SY21/20180214/106862/HHRG-115-SY21-Wstate-YiannasF-20180214.pdf, p. 3-5

[442] "Kim Nilsson – Cracking MtGox," TheBitcoinArmy, September 10, 2017,
https://www.youtube.com/watch?v=l70iRcSxqzo&t=3s

[443] For more details on Silk Road, see Bearman, Joshuah, "The Rise & Fall of Silk Road", Wired, April 2015, https://www.wired.com/2015/04/silk-road-1/ & https://www.wired.com/2015/05/silk-road-2/

[444] Foley, Sean, Jonathan Karlsen, and Talis j. Putnins, "Sex, Drugs, and Bitcoin: How Much Illegal Activity is Financed Through Cryptocurrencies?",
January 15, 2018,
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3102645

[445] The New Palgrave Dictionary of Economics, Palgrave Macmillan, London, 2008
http://www.dictionaryofeconomics.com/article?id=pde2008_S000278&edition=current, there are more sentences to this but it captures the thoughts

[446] Fox, Justin, "What's That You're Calling a Bubble," Harvard Business Review, January 8, 2014, https://hbr.org/2014/01/whats-that-youre-calling-a-bubble

[447] Steimetz, Seiji, "Bubbles," The Concise Encyclopedia of Economics, Library of Economics and Liberty,
http://www.econlib.org/library/Enc/Bubbles.html

[448] Shapira, Arie and Kailey Leinz, "Long Island Iced Tea Soars After Changing Its Name to Long Blockchain," Bloomberg Markets, December 21, 2017, https://www.bloomberg.com/news/articles/2017-12-21/crypto-craze-sees-long-island-iced-tea-rename-as-long-blockchain

[449] Useless Ethereum Token, "The world's first 100% honest Ethereum ICO,"
https://uetoken.com/, other entertaining quotes from this ICO includes "If I don't make enough money to buy at least one flat-screen television, I'll probably keep the ICO open longer than initially stated." and "You're literally giving your money to someone on the internet and getting completely useless tokens in return."

[450] Palmer, Jackson, "My Joke Cryptocurrency Hit $2 Billion and Something Is Very Wrong," Vice Motherboard, January 11, 2018,
https://motherboard.vice.com/en_us/article/9kng57/dogecoin-my-joke-cryptocurrency-hit-2-billion-jackson-palmer-opinion

[451] Data from CoinMarketCap, https://coinmarketcap.com/coins/

[452] "The DAO of accrue," The Economist, May 19, 2016,
https://www.economist.com/news/finance-and-economics/21699159-new-automated-investment-fund-has-attracted-stacks-digital-money-dao

[453] Price, Rob, "Digital currency Ethereum is cratering because of a $50 million hack," Business Insider, June 17, 2016, http://www.businessinsider.com/dao-hacked-ethereum-crashing-in-value-tens-of-millions-allegedly-stolen-2016-6?r=UK&IR=T

[454] del Castillo, Michael, "Ethereum Executes Blockchain Hard Fork to Return DAO Funds," CoinDesk, July 20, 2016, https://www.coindesk.com/ethereum-executes-blockchain-hard-fork-return-dao-investor-funds/

[455] Securities and Exchange Commission v. Howey Co., 328 U.S. 283, 1946, https://supreme.justia.com/cases/federal/us/328/293/case.html

[456] Van Valkenburgh, Peter "Is Bitcoin a Security?", Coin Center, January 25, 2017, https://coincenter.org/entry/is-bitcoin-a-security

[457] "SEC Issues Investigative Report Concluding DAO Tokens, a Digital Asset, Were Securities," Securities and Exchange Commission, July 25, 2017, https://www.sec.gov/news/press-release/2017-131

[458] "Company Halts ICO After SEC Raises Registration Concerns," Securities and Exchange Commission, December 11, 2017, https://www.sec.gov/news/press-release/2017-227

[459] "SEC Emergency Action Halts ICO Scam," Securities and Exchange Commission, December 4, 2017, https://www.sec.gov/news/press-release/2017-219, "SEC Halts Alleged Initial Coin Offering Scam," Securities and Exchange Commission, January 30, 2018, https://www.sec.gov/news/press-release/2018-8

[460] Clayton, John, Testimony before the United States Senate Committee on Banking, Housing, and Urban Affairs on "Virtual Currencies: The Oversight Role of the U.S. Securities and Exchange Commission and the U.S. Commodity Futures Trading Commission," Securities and Exchange Commission, February 6, 2018, https://www.banking.senate.gov/public/_cache/files/a5e72ac6-4f8a-473f-9c9c-e2894573d57d/BF62433A09A9B95A269A29E1FF13D2BA.clayton-testimony-2-6-18.pdf

[461] "Consensus 2017: New Regulatory Challenges for Blockchain Technology," Coindesk, August 7, 2017, https://youtu.be/YTlfXxs5rUY?t=16m17s

[462] Batiz-Bent, Juan, Marco Santori, and Jesse Clayburgh "The SAFT Project: Toward a Compliant Token Sale Framework," Protocol Labs and Cooly, October 2, 2017, https://saftproject.com/static/SAFT-Project-Whitepaper.pdf

[463] Internal Revenue Service, Notice 2014-21, April 14, 2014, https://www.irs.gov/pub/irs-drop/n-14-21.pdf

[464] Lewis, Troy, "Re: Comments on Notice 2014-21: Virtual Currency Guidance," American Institute of CPAs, June 10 2016, https://www.aicpa.org/advocacy/tax/downloadabledocuments/aicpa-comment-letter-on-notice-2014-21-virtual-currency-6-10-16.pdf

[465] Treasury Inspector General for Tax Administration, "As the Use of Virtual Currencies in Taxable Transactions Becomes More Common, Additional Actions Are Needed To Ensure Taxpayer Compliance," September 21, 2016, https://www.treasury.gov/tigta/auditreports/2016reports/201630083fr.pdf

[466] "Creating tax parity for cryptocurrencies," Representative David Schweikert, September 7, 2017, https://schweikert.house.gov/media-center/press-releases/creating-tax-parity-cryptocurrencies

[467] Schweikert, David, "H.R. 3708 To amend the Internal Revenue Code of 1986 to exclude from gross income de minimis gains from certain sales or exchanges of virtual currency, and for other purposes," Congress.gov, https://www.congress.gov/bill/115th-congress/house-bill/3708?r=4

[468] Van Valkenburgh, Peter, "The Need for a Federal Alternative to State Money Transmission Licensing," Coin Center, January 30, 2018, https://coincenter.org/entry/federal-alternative-to-state-money-transmission

[469] "Laboratories of democracy," Wikipedia, https://en.wikipedia.org/wiki/Laboratories_of_democracy

[470] "Regulation of Virtual Currency Businesses Act," Uniform Law Commission, http://www.uniformlaws.org/Committee.aspx?title=Regulation%20of%20Virtual%20Currency%20Businesses%20Act , Van Valkenburgh, Peter, "The Uniform Law Commission Has Given States a Clear Path to Approach Bitcoin," Coin Desk, July 27, 2017, https://www.coindesk.com/uniform-law-commission-given-states-clear-path-approach-bitcoin/http://www.uniformlaws.org/Committee.aspx?title=Regulation%20of%20Virtual%20Currency%20Businesses%20Act

[471] Van Valkenburgh, Peter, "The Need for a Federal Alternative to State Money Transmission Licensing," Coin Center, January 30, 2018, https://coincenter.org/entry/federal-alternative-to-state-money-transmission

[472] Boring, Perianne, "Protecting blockchain from 'Mad Hatter' treatment," *The Hill*, November 21, 2017, http://thehill.com/opinion/technology/361220-protecting-blockchain-from-mad-hatter-treatment

[473] Clayton, Jay and J. Christopher Giancarlo, "Regulators Are Looking at Cryptocurrency," *Wall Street Journal*, January 24, 2018, https://www.wsj.com/articles/regulators-are-looking-at-cryptocurrency-1516836363

VIEWS OF RANKING MEMBER
MARTIN HEINRICH

I am pleased to share the Joint Economic Committee (JEC) Democratic response to the 2018 *Economic Report of the President.* The JEC is required by law to submit findings and recommendations in response to the *Economic Report of the President* (the ERP), which is prepared and released each year by the Council of Economic Advisers (CEA).

This response focuses, in particular, on the actions Republicans have taken on taxes, their ongoing efforts to undermine Americans' health care, the administration's belated and inadequate plan to address the nation's crumbling infrastructure, and its dangerous efforts to roll back regulations that protect consumers and the environment.

As detailed in the pages that follow, the Republican tax law will explode the deficit, widen the gap between the rich and everyone else, and ultimately increase taxes on tens of millions of middle-class households. The changes in health care will reduce the number of insured and push premiums higher. The administration's infrastructure plan shifts the burden of responsibility to state and local governments and fails to meet the urgent needs identified in the ERP. Its approach to deregulation picks winner and losers, threatens the health and safety of Americans, and fails to address increased market concentration across industries and its negative impacts on growth, productivity and wages.

In fundamental ways, the 2018 ERP is disconnected from reality. It devotes a chapter to innovative policies to improving all Americans' health while dismissing recent gains in health

insurance coverage through the Affordable Care Act (ACA) and attempting to call into question the link between health insurance and health outcomes. Such thinking motivated the unsuccessful Republican attempts to repeal the ACA and animates their continued efforts to sabotage the health care markets and undermine Medicaid enrollment, ultimately reducing coverage and increasing costs for those who need it the most.

The ERP includes a chapter on addressing cybersecurity threats, somehow ignoring the fact that President Trump has refused to acknowledge in any meaningful way that Russia interfered with the 2016 elections, through bots, fake news, manipulation of social media, and direct infiltration of voting systems, and is preparing to do so again in the upcoming 2018 midterms. Head of the National Security Agency Admiral Mike Rogers recently testified to Congress that the president has not asked him to counter Russian efforts to influence U.S. elections.[1]

The ERP lays out the need for enhancing U.S. trade, glossing over the fact that the trade deficit increased by 12.1 percent in 2017, reaching its highest level since 2008 as U.S. imports surged, despite a falling dollar.[2] In its discussion of the administration's recent imposition of a tariff on all solar panel imports, the ERP fails to acknowledge that this tariff will actually hurt American workers and consumers for the benefit of foreign-owned firms.

For an ERP to have lasting value, it should offer objective, academic analysis, rooted in rigorous examination of the facts and grounded in economic theory to inform policymaking in the future. Unfortunately, like the CEA's analysis last year estimating that a large cut in the corporate tax rate would boost average household income by at least $4,000, which is again repeated in the ERP, much of this report lies far outside of the economic mainstream.

For example, the ERP and the administration's recent FY 2019 budget make estimates about economic growth that are very different from those of the Federal Reserve, Congressional Budget Office, and private forecasters.[3] While the administration is predicting growth of about 3 percent each year for the next decade, others estimate that growth will be closer to 2 percent.[4] Growth of 3 percent would be a significant departure from past performance, where annual GDP growth has averaged less than 2 percent since 2001.[5]

President Trump inherited an economy that was continuing to strengthen in its 8th year of recovery and adding more than 2 million jobs annually for the six previous years. Wages had begun to move up. GDP had grown a modest 1.5 percent in 2016, after increasing by 2.9 percent in 2015.[6] Those trends remain largely in place today, despite the administration's harmful agenda. But so, too, do the demographic and structural challenges constraining long-term economic growth.

Longer-term structural challenges include:

- An aging population, which will slow labor force growth, in the absence of immigration reform or efforts that bring disconnected workers back into the labor force.

- Slow productivity growth as well as slow public and private sector investment growth.

- Increasing concentration in many industries, which limits innovation and entrepreneurship and leads to lower pay for workers

- High levels of income inequality and low levels of economic mobility, which threaten the underpinnings of the economy.

The administration is projecting 3 percent growth without taking any actions to overcome well-known barriers to long-term growth. Faster economic growth can be achieved by more people working or people working more productively. The retirement of baby boomers, along with the plateauing of women's labor force participation rates, makes a dramatic increase in hours worked unlikely. In fact, the Congressional Budget Office estimates that hours worked over the next decade will increase by 0.4 percent each year compared to 1.3 percent annually from 1950 to 2016.[7] Changes to immigration laws advocated by the Trump administration to restrict immigration, or to kick out workers already here, would further limit the size of the labor force and apply downward pressure on growth. It is not surprising, therefore, that the ERP is silent on immigration reform.

Recent history suggests strong productivity growth will be difficult to achieve as well. As noted in the ERP, average annual productivity growth between 1953 and 2017 was 2.0 percent (Table 8-2). And more recently, between 2007 and 2016, average annual labor productivity growth was just 1.1 percent.[8] Yet, to reach its aggressive growth targets, the administration is predicting annual productivity gains of 2.6 percent over the next decade (Table 8-2). The sluggish productivity growth over the past decade is not just a U.S. phenomenon – it's a worldwide challenge. In fact, the United States has actually outpaced Japan, Canada, Germany, and France in productivity growth over the past decade (Figure 8-41).

One path to increasing the number of hours worked is to implement policies that enable workers to better meet both their work and family responsibilities. Instituting a national paid leave policy, for example, would allow more workers to stay connected to the workforce after the birth or adoption of a child, reducing

turnover rates and boosting labor participation rates.[9] More accessible and affordable child care would help reach the same objectives. Opioid abuse treatment and prevention could help more workers stay in the workforce, contributing to their communities and increasing economic output. Despite campaign promises in each of these areas, the Trump administration has been slow to address these challenges.

Similarly, fixing the nation's infrastructure, as noted in the ERP, can boost productivity and increase competitiveness. Yet, while it is not stated in the ERP, the administration failed to present an infrastructure plan it its first year in office, and when the plan was finally announced in February, it failed to address the nation's urgent needs.

Republicans are counting on businesses to significantly increase capital investment, which would make workers more productive. And, certainly, some increase in business investment is expected following tax reform. But the early signs are concerning. Instead of investing in their plants and facilities, companies have moved quickly to initiate stock buybacks, which will benefit shareholders and wealthy investors but do little to increase productivity or ultimately boost worker wages. Since January 1st, companies have announced more than $200 billion in buybacks, more than 30 times the amount companies have announced in bonuses and wage hikes for workers.[10]

What's particularly damaging, over the longer term, is that the administration and Republicans in Congress have jeopardized the nation's fiscal health by passing a tax package that will add nearly $1.5 trillion to deficits over the next 10 years. Republicans pursued fiscal stimulus when it wasn't warranted or needed. They also elected not to pay for it, instead passing the cost on to the next generation and to state and local governments. In fact,

Republicans are shifting more responsibilities, such as infrastructure, to the states while simultaneously constraining states' ability to raise revenues through a new cap on the state and local income tax deduction (SALT).

The administration has already taken actions that will harm consumers and the economy in areas such tax, health care, and consumer financial protection. Under the mantle of deregulation, the administration has removed fundamental labor, environmental and consumer protections. In other areas, including infrastructure, the administration has unveiled plans, but so far it has not been successful in persuading Congress of the merits of its approach and there has been little movement. In still other areas, the administration has ignored major challenges, such as the opioid crisis, the rising costs of education, the impact of climate change already being felt by communities, and others.

To foster strong inclusive economic growth, it is vital that the United States invest in our nation's physical and human capital. A real infrastructure plan that modernizes roads, bridges, schools, ports, and water systems and improves access to broadband networks is critical to laying the groundwork for strong future growth. So too are investments in our children, workers, R&D, and communities of all sizes and in all regions of this country. Other than a brief discussion of broadband expansion, which calls out the supposed "detrimental effects" government intervention can have on the private market, there is little attention in the ERP paid to the unique challenges facing rural America. Ignoring these varied challenges or looking to the private sector to address them, as the administration regularly advocates, will not achieve significant progress.

The administration and congressional Republicans spent much of the past year focused on repealing health care coverage and

handing out tax gains to the wealthy and large corporations. They ignored issues that demand action – from addressing DACA by the deadline the president created, to reducing gun violence, to fixing the nation's broken infrastructure. The same selective approach to identifying the challenges and opportunities ahead is evident in the ERP. As we look forward, it is vital that Republicans and Democrats work together to craft bipartisan solutions to the nation's most urgent problems.

CHAPTER 1: THE REPUBLICAN TAX LAW LEAVES AMERICAN FAMILIES BEHIND

In 2017, the Trump administration and congressional Republicans rushed into law a highly partisan effort to remake the tax code. Smart reform would have made the tax code more efficient and fairer, while maintaining sufficient revenue to fund the government. Instead, Republicans cut taxes for the wealthy, raised taxes on working families over the next decade, and put the burden of paying for the cuts on future generations.

The ERP makes bold claims about the impact of the tax law, claims that are absurdly out of step with nonpartisan experts' estimates. It claims that the law will result in two to four percent additional GDP growth, despite nonpartisan scorekeepers estimating that the economic impact will be a fraction of one percent.[11] It claims that the law will result in thousands of dollars in wage gains for the average family, despite a large body of literature demonstrating that this is highly unlikely. It is also worth noting that the ERP analysis only focuses on a small portion of the tax changes, namely the statutory corporate rate cut, and ignores most of the law. It also presents estimates of provisions not even part of the law, such as permanent full expensing, further inflating already overly optimistic estimates of the economic impact.

The actual impacts of the new tax law are clear. The wealthy will get wealthier. Working families see what little relief they get disappear after a few years. The deficit will soar as revenues plummet, and Republicans will point to spending as the problem. Corporations will pocket the gains. And the law will create confusion and complexity for years to come.

THE TAX LAW WILL OVERWHELMINGLY BENEFIT THE WEALTHY

The ERP portrays the tax plan as tax relief for the middle class and small businesses, but distributional analyses from nonpartisan organizations were all in agreement that this is false—the wealthiest Americans are the big winners from the Republican tax cut. By the time the law is fully implemented in 2027, 99.2 percent of the tax benefits will flow to the top five percent of households. This is largely due to the fact that the tax cuts for middle-class families are small and temporary, while the biggest cuts, which are reserved for corporations, are permanent. The benefits of a reduction in corporate taxes largely go to the owners of capital, who are overwhelmingly wealthy. The highest ten percent of earners hold, on average, more than 26 times as much in stock investments as the bottom half of earners hold on average.[12]

Vast Majority of Gains Under GOP Tax Law Go to the Wealthiest Americans

99.2%

Share of tax change

100%	
80%	
60%	
40%	
20%	**2.9%** **8.3%**
0%	
-20%	**-4.6%** **-5.4%** **-2.1%**

Lowest 20% | Lower-Middle 20% | Middle 20% | Upper-Middle 20% | 80th - 95th pctile | Top 5 percent

Source: Tax Policy Center
Note: Shows the tax change once the law is fully implemented in 2027.

Changes to the individual side of the code will also increase wealth and income inequality. The ERP focuses on limitations to the mortgage interest deduction and state and local tax deductions, claiming that it will make the code more progressive. This is disingenuous, though, as it fails to account for many other pieces of reform that more than counteract those changes and benefit the wealthy.

Doubling the estate tax exemption, for instance, only benefits families bequeathing millions of dollars to their heirs. The impact will be to further exacerbate intergenerational wealth inequality. Contrary to Republican claims, the estate tax impacts few small businesses and family farms, and those that it does impact have the ability to pay the tax over an extended time period to avoid

having to divest such assets.[13] The tax law also raised the threshold for the Alternative Minimum Tax, which will provide $637 billion in tax cuts over the next ten years that will flow to the wealthiest Americans.[14] Overall, nonpartisan distributional analyses are clear—the wealthiest Americans get a huge and permanent tax break in the new law.

WORKING FAMILIES WILL ULTIMATELY SEE A TAX HIKE

The administration touted the doubling of the standard deduction as a win for American families. In reality, however, the impact of this change is muted by the removal of exemptions and other important deductions. For families with multiple dependents, trading those exemptions for the larger standard deduction could be a net loss. Further, limiting deductions that many middle-class families rely on, such as the state and local income tax deduction and mortgage interest deduction, results in millions of families seeing a tax hike. This year alone, more than 8.4 million households will see a tax increase.[15]

This is all compounded by the fact that the little tax relief provided to families is scheduled to sunset in 2025. Meanwhile, a permanent change to how tax brackets are indexed will result in bracket creep, where inflation eats into the thresholds and families start moving up in brackets even without gains in real income.[16] The end result is that the plan will actually raise taxes on middle-income families in the long-run. By 2027, more than half of households will be paying more than they would have before the GOP tax law.[17]

The ultimate effect of tax cuts for the wealthy and tax hikes for working families is that, by 2027, the law will increase after-tax income inequality. The top 1 percent will receive a 0.9 percent increase in after tax income, and the top 0.1 percent will receive a 1.4 percent increase in after tax income. Meanwhile, households

in the bottom 80 percent of income will have no net change to after tax income or will even see a decrease, as taxes rise.[18] This comes at a time where income inequality has been on the rise for decades and is likely already having negative effects on economic growth.[19]

THE LAW WASTES $1.5 TRILLION THAT COULD HAVE BEEN INVESTED IN PEOPLE AND COMMUNITIES

Economists have long called for leveling out the corporate income tax by eliminating loopholes and using that revenue to lower the topline rate. The opportunity for this type of deficit-neutral reform could be seen in the gap between effective tax rates and statutory tax rates. Under this approach, the corporate tax rate could have been lowered to the mid to high twenty percent range, without incurring huge deficits or raising taxes on individuals.

Instead, Republicans became fixated on getting the corporate tax rate to as close to 20 percent as possible and in the process ended up blowing the deficit wide open. In the end, they cut it from 35 to 21 percent, a 40 percent reduction. For eight years under the Obama administration, congressional Republicans and other party leaders decried the increase in the deficit and national debt that followed the recession. Those concerns were nowhere to be found in the tax debate, though. Republicans eventually landed on passing $1.5 trillion in unfunded tax cuts.

Deficit spending is not always bad for the economy. During economic downturns, running federal deficits can stimulate the economy and reduce the impact and duration of recessions. But most mainstream economists tend to advocate for either lowering deficits as the economy recovers or at least holding them steady as the economy grows, thereby reducing the deficit-to-GDP ratio. Few advocate for large stimulus spending this far into a recovery. Larger deficits now could potentially result in higher levels of

inflation, and spur the Federal Open Market Committee to raise interest rates faster than they had otherwise planned.

That $1.5 trillion also represents a missed opportunity. While the tax plan is unlikely to generate much additional economic growth, it will reduce revenues that could have been used on more productive programs. Republicans could have used that money to expand the Earned Income Tax Credit, which has been proven to increase labor force participation and reduce poverty.[20] They could have sent every child in America to a high-quality early education program and expanded access to affordable college.[21] Or they could have put a serious dent in America's infrastructure gap. Research by the CBO has shown that spending on infrastructure or other direct spending by the government has substantially more stimulative impact on the economy than tax cuts for the wealthy.[22]

THE TAX PLAN IS UNLIKELY TO LEAD TO LARGE WAGE GAINS

The administration and congressional Republicans pitched the tax cuts as a boon for the middle class, arguing that the corporate tax cut will lead to massive wage gains. Their most highly-cited figure of an increase in average household income of $4,000 was met with skepticism and doubt by experts. Even authors cited in the Council of Economic Advisers' research claimed that the administration misused their findings to come to an implausible result.[23] The ERP repeats this unlikely claim and doubles down on it by suggesting that the gains will likely even be larger.

Economists largely agree that a small portion of the corporate income tax falls on workers. The Joint Committee on Taxation estimates that 25 percent of the tax falls on labor, while the Tax Policy Center assumes 20 percent.[24] But the vast majority of the benefits go to capital, the shareholders and owners of the

companies. Expecting corporate tax cuts to largely trickle down to workers does not align with past research or history. The United Kingdom presents an apt example—when the country cut their corporate tax rate from 30 percent to 20 percent, wages actually declined.

Corporate Tax Cuts Did Not Raise Wages in UK

Source: U.K. Office of National Statistics and OECD

And recent company announcements already provide early evidence that shareholders will be the big winners of the tax cut. Companies have made many announcements about what they plan to do with their tax windfalls. A small share is going to bonuses and direct raises—although there should be doubt that these raises and bonuses are entirely due to the tax cut and not due to tightening labor markets. And a small share is going to capital spending – again, though, without a plausible counterfactual it is difficult to

give entire credit for this spending to the tax plan.[25] Meanwhile, companies announced more than twice as much in share buybacks through the first week of February as they had through the same point in the prior year.[26]

The administration's claims on wage gains from the tax cut also fail to factor in the inequality within labor income. The share of gains that go to labor because of the tax cut will not be evenly distributed. In fact, there is increasing divergence between productivity gains and the earnings of the median worker.[27] This is likely due to a myriad of factors, such as declining bargaining power for workers and increasing market concentration enhancing monopsony effects (where workers have fewer options for employers, and therefore employers are under less pressure to share productivity gains with them in the form of wage increases).[28] Without addressing these other factors, simply boosting productive investments will not solve the problem of stagnating wages for most American families.

COMPLEXITY AND LOOPHOLES ABOUND IN THE NEW TAX LAW

Over time, the tax law tends to increase in complexity, as Congress creates new credits and deductions to incentivize some activity, and businesses and industries change over time. Republicans talked about simplifying the tax code. They said it was a primary motivation behind reform and even promised that individuals would be able to file their taxes on a postcard. The goal was to clear out deductions and credits that were no longer justified, fix loopholes that allowed businesses and individuals to avoid paying taxes, and make it easier for people and businesses to file taxes. On this account, the Republican tax law fails unequivocally.

To pass the law through on a partisan basis, without Democratic input or votes, Republicans used budget reconciliation, which

requires bills to be deficit neutral after the ten year budget window. This meant putting in sunsets on many of the changes. Because the GOP's goal was to enact permanent corporate tax cuts, they sunset most of the changes to the individual side (with the major exception being the permanent change in inflation measure that raises taxes on families in the long run). Their talking points, though, told Americans that they can expect Congress to extend those provisions once the deadline is near.[29] This sets up a situation where Americans will not be sure how they will be taxed in the long-run, making it difficult for them to make decisions on home purchases, moves, medical expenses, and other major life expenses whose tax implications will be unknown.

If Republicans intended to close loopholes in the tax code, they failed on that account as well. Tax experts identified dozens of potential loopholes before the law was even implemented.[30] Corporate attorneys and accountants will be spending the next several years identifying many more. Absent uncertain fixes, this could further undermine tax revenue and cause deficits to be even higher. Further, it will create imbalances where contractors and workers in similar positions are paying different rates, and where business owners will have a tax incentive to actually not work. It will be years before we fully know all of the distortive and revenue-decreasing impacts of the new tax law, but the early indications are that there will be plenty.

BIPARTISANSHIP WOULD HAVE BEEN A GOOD PLACE TO START FOR TAX REFORM

Undertaking tax reform was a worthwhile objective. The corporate tax code was rife with loopholes, allowing companies in the same industry or of the same size to pay vastly different tax rates and allowing multinational corporations to stash trillions of dollars in profits in overseas accounts that let them off without paying taxes.

Further, the individual side of the code was overly complex leading to confusion and high compliance costs for many tax payers.

Enacting bipartisan and deficit-neutral tax reform would have been a significant accomplishment for the administration and Congress. But Republicans decided to take another track in 2017, never trying to engage congressional Democrats and instead opting to use arcane budget procedures to jam through an ill-conceived bill. The result was a deficit-busting tax cut for the wealthy with few redeeming qualities. The legacy of this tax law will be a boon to the wealthy and a burden on future generations.

Chapter 2: Republicans Undermine Americans' Health Care

Nowhere has the Republican assault on American families been more sustained and harmful than in the area of health care. Throughout 2017, the president and congressional Republicans launched many attacks on our health care system, attempting to take coverage away from millions of Americans and threatening to destabilize nearly one-sixth of our economy.[31]

Progress from the ACA

First, it is useful to recall the important progress made by the Affordable Care Act (ACA) in expanding access to affordable, quality health care. In 2016, 26.3 million more people had health coverage than before the passage of the ACA.[32] The uninsured rate has more than halved, from 18.2 percent to 8.8 percent.[33] These important gains are dismissed in the ERP, though, by questioning the link between health insurance and health outcomes.

Prior to the implementation of the ACA, the individual market was in disarray. People were regularly denied coverage due to pre-existing conditions, and there was very little competition. One study estimated that 62 percent of pre-ACA individual market plans did not cover maternity care, nearly 20 percent did not cover mental health, and 34 percent did not cover substance abuse treatment services.[34] Information provided by insurers was unclear on what any given plan did or did not cover, leaving families to navigate murky benefits language and ultimately play guessing games with their health. The ACA guaranteed that insurers could no longer discriminate against Americans for having pre-existing conditions, for being a woman, or for being older, and it guaranteed coverage for essential health benefits.

The ACA slowed the rise in costs for both patients and providers and improved care across the board. For families with employer-sponsored insurance, total premiums and out-of-pocket costs rose half as fast in the six years after the passage of the ACA, compared the prior decade.[35] The ACA's Medicaid expansion was particularly important to hospitals: from 2013 to 2015, the burden of uncompensated care declined by more than a quarter as a share of hospital operating costs.[36] It especially helped rural hospitals: in Medicaid expansion states, rural hospitals improved their operating margins more than those in non-expansion states.[37]

COVERAGE GAINS IMPROVE LIVES

The ERP attempts to downplay the importance of having health care coverage and the importance of the ACA and Medicaid. Health coverage increases access to care and improves health outcomes. This has borne out recently in several studies evaluating health outcomes after health care expansions. A study of Massachusetts' 2006 health care expansion found significant reductions in mortality compared to similar counties nationwide.[38] A study of Medicaid expansions in Maine, Arizona, and New York found that expansions were associated with a reduction of 6.1 percent in mortality and decreased rates of delayed care due to costs by 21.3 percent.[39] A study conducted in Oregon demonstrated greater access to preventative screening and treatment via increases in diabetes diagnoses and use of diabetes medications as well as improvements in depression cases— although it did not provide a large enough sample to make a definitive conclusion on the impact to mortality.

Health insurance also provides families greater financial security by protecting against the risk of insurmountable debt due to unexpected medical bills. In a study of Medicaid's effects in Oregon, insured families had a $390 average decrease in medical

bills sent to collection after gaining coverage.[40] Another study found that those who gained coverage through Medicaid expansion decreased their debt in third-party collection by $1,140.[41] When families are able to better manage their finances, they maintain upward economic mobility.

Access to adequate health care should be a right for all people. Returning to a broken system where the uninsured can depend only on emergency care and families must file for medical bankruptcy is untenable for both patients and providers. This cost can be borne through emergency visits and rising debt or, more effectively, through an integrated health system that balances costs and care equitably across patients. Instead of working with Democrats to build upon the ACA's successes, however, Republicans continue to try to throw away all progress.

WORKING TO TAKE INSURANCE FROM MILLIONS

Republicans' attempts at repealing the ACA would have taken away health care from over 20 million people across the country, forced consumers in the individual market to pay more for less, and gutted the Medicaid program.[42] If passed, TrumpCare would have allowed insurers to discriminate against those with pre-existing conditions again, increased the cost of maternity care, and unraveled efforts to combat the opioid epidemic.

Uninsured Projected to Skyrocket To Pre-ACA Levels Under TrumpCare

At Least 49M Uninsured

Millions of Uninsured

60
50
40
30
20
10
0

2000   2005   2010   2015   2020   2025

— Pre-ACA   — ACA
- - - ACA Projections   - - - BCRA Projections

Source: Congressional Budget Office (CBO), Kaiser Family
Foundation and CPS ASEC
Note: Number of individuals without health coverage under age
65; 1999-2015 data from CPS; 2016 data from Kaiser Family
Foundation; 2017-2026 data from 2017 CBO projections; BCRA
is Republican Senate Plan and ACA is Affordable Care Act

Under TrumpCare, states would have been allowed to let insurers charge more for people with pre-existing conditions, including cancer patients.[43] A 40-year-old with metastatic cancer could have seen a premium increase of $142,650.[44] Unravelling essential health benefits would have removed guaranteed coverage of maternity care and mental health and substance use disorder services. Hospitals across America would have faced greater uncompensated costs, threatening vulnerable rural hospitals in particular.

SABOTAGING HEALTH CARE MARKETS

Although Republicans failed to pass TrumpCare, they have taken multiple steps to undermine health care in America. They started off by filling administration positions with officials actively hostile to the ACA, such as former Health and Human Services

Secretary Tom Price and current Centers of Medicare and Medicaid Services Administrator Seema Verma, who have sabotaged the ACA by rolling back provisions that keep markets working and costs down.

The Trump administration's decision to end cost-sharing reduction (CSR) payments will hike 2018 premiums by 20 percent, or $2,289 for a family of three.[45] Republicans refuse to take sensible, bipartisan steps, including restoring CSRs, to stop further cost increases. Unable to repeal the Affordable Care Act, the Republican tax bill repealed the ACA individual shared responsibility provision, effectively cutting coverage for 13 million people over the next decade and hiking individual market premiums by 10 percent.[46]

In addition, in its attempt to curb enrollment, the administration has undermined individual market stability by cutting the open enrollment period in half and slashing the ACA outreach budget by 90 percent.[47] Although federal signups during open enrollment for 2018 were fairly robust—11.7 million signups despite these issues—enrollment across states varied. States with their own marketplaces saw enrollment increase by 0.2 percent, while states where the federal government administers the marketplace through healthcare.gov saw enrollment decrease by 5.3 percent.[48]

These actions, along with continued ACA repeal efforts, produce uncertainty for insurers, providers, and consumers. Without certainty, businesses weigh the risks of the worst-case scenario, leaving consumers with higher prices and no insurers in some high-risk areas.[49]

On top of this, the Trump administration and Republican leadership have refused to adopt a bipartisan solution to stabilize markets. Analysis from Blue Cross Blue Shield shows that passing

a stabilization measure would reduce premiums in 2019 by 27 percent, providing much relief to American families.[50] If this applied across all insurers, people insured through the marketplaces would save an average of $1,772 in 2019.[51]

In addition, the Trump administration has continued to erode the ACA's consumer protections through its executive orders on Association Health Plans and short term limited duration plans, which allow for skimpier junk plans to be sold. These orders allow insurers to once again discriminate against people with pre-existing conditions and allow plans that exclude coverage for maternity care, prescription drugs, mental health, and substance use disorder services. If these junk plans substantially cut into marketplace enrollment, they could cause a death spiral where sicker people are left in the marketplaces while healthy people leave, causing more insurers to pull out and premiums to skyrocket.

SABOTAGE OF MEDICAID

While the ERP's thematic shift from insurance to health behaviors reflects Republican attempts to deflect attention from the success of the ACA and importance of insurance, the ERP is noticeably silent on its actions to undermine Medicaid and Medicare. Medicaid and Medicare, two programs millions of American families rely on, continue to be sabotaged as part of this effort.

TrumpCare would have slashed Medicaid by 35 percent in the long term. This reduction would end Medicaid as we know it.[52] Severe cuts to Medicaid would force states to make tough choices between maintaining Medicaid coverage and cutting important programs such as education or infrastructure. Despite the failure of TrumpCare in Congress, the administration has continued to trumpet replacing Medicaid with draconian caps and block grants,

including it in its FY 2019 proposed budget. In fact, the White House FY 2019 budget cuts Medicaid and related health spending by $675 billion.[53]

Despite the failure of TrumpCare, the Trump administration is sabotaging Medicaid by giving states the green light to implement work requirements and other disastrous policies through waivers. Evidence from other programs show that work requirements simply do not work—they fail to increase employment in the long run and instead kick off the people who need it the most. Most people who can work already do; in fact, more than 90 percent of adult Medicaid recipients are working, ill or disabled, taking care of home or family, or going to school.[54]

Vast Majority of Medicaid Recipients are Working, Disabled, Caregivers, or in School

Source: JEC calculations based on Kaiser Family Foundation analysis
Note: Includes non-elderly, non-SSI recipients

Other waiver provisions that are currently under review have similarly devastating effects. Some proposals request the authority to charge premiums, when research shows even small increases in cost-sharing can disincentivize coverage.[55] Others add more bureaucratic red tape by locking enrollees out of coverage for

missing paperwork and other deadlines or forcing enrollees to take a health or financial literacy course to re-enroll. Other proposals include dropping coverage of non-emergency transportation—especially difficult for those in rural America who lack a car—or imposing drug tests even though enrollees heavily rely on Medicaid to seek treatment for substance use disorders such as opioid addiction. Altogether, these proposals run counter to the purpose of the Medicaid program and would only impose larger barriers to people getting the health care they need.

ATTACKS ON WOMEN, CHILDREN, AND RURAL COMMUNITIES

Republicans continue to undermine the health coverage and consumer protections that millions of families depend on. For months, congressional Republicans endangered children's health coverage by delaying reauthorization of funding for the Children's Health Insurance Program (CHIP), allowing the program to remain in limbo for months and leaving states scrambling to prevent dropping children from coverage.

The administration also rolled back protections guaranteeing access to no-cost contraception for 62 million women, which could increase annual contraceptive costs by $600 per person.[56] In addition, women are disproportionately threatened by Medicaid work requirements, as women—who comprised over 60 percent of non-elderly Medicaid enrollees who were not working in 2016—are more likely to be taking care of children or aging parents and more likely to have a disability, two of the most common reasons Medicaid enrollees do not work outside the home.[57]

Republicans' attempts to repeal the ACA would have disproportionately harmful impacts on rural communities. Medicaid covers one out of every four rural residents under the

age of 65. Further, rural hospitals often have operating margins of less than 1 percent, with Medicaid making up more than 10 percent of net revenue for rural hospitals. Gutting Medicaid would put rural hospitals at risk of closure, endangering quality of care, good-paying jobs, and the economic sustainability of rural communities.[58]

LACK OF ACTION ON THE OPIOID EPIDEMIC

Although the ERP correctly identifies the opioid epidemic as a key challenge for the nation—estimating that the country lost $504 billion in economic activity in 2015 alone—the Trump administration has done little to help struggling families and communities.[59] In fact, the administration has made matters worse: after the president's opioid commission fizzled out with very little impact, and his public emergency announcement led to very little additional funds, the administration continues to threaten states' best tool against the epidemic, Medicaid.

One estimate shows that the total cost of coverage for people receiving treatment for opioids could reach $220 billion over the next decade.[60] The bipartisan budget deal passed in February 2018 took an important step in the right direction—including $6 billion for addressing the epidemic—but there is much more to be done.

TrumpCare would have set our nation many steps back on combatting the opioid crisis through its drastic Medicaid cuts, reversal of Medicaid expansion, and removal of guaranteed coverage of mental health and substance abuse disorders. Medicaid covers about a quarter of life-saving medication-assisted treatment for people with opioid and heroin addictions.[61] Repealing the ACA could put 1.3 million people at risk of losing their behavioral health coverage. Medicaid expansion also reduced the unmet need for substance use disorder treatment among low-

income adults by 18 percent.[62] Rolling back funding for those impacted by the opioid and heroin epidemic to get treatment steers this nation in the exact opposite direction.

Medicaid state waiver requirements would especially threaten coverage for those that rely on Medicaid for treatment. Some states have submitted waivers that would implement drug screening and testing, a clear impediment for those struggling with addiction. For those who have had trouble going to work due to their addiction or chronic pain, work requirements can be especially onerous.[63] Evidence from work requirements in the Temporary Assistance for Needy Families program have been shown to particularly negatively impact people struggling with mental health and substance abuse.[64]

FAILING TO LOWER DRUG PRICES FOR EVERYDAY AMERICANS

The ERP also accurately diagnoses the importance of reducing the costs of prescription drugs for both consumers and taxpayers. List prices for drugs in other developed countries are 41 percent lower on average for the 15 companies that sell the 20 top-selling drugs in the U.S.[65]

In order to achieve a reduction in drug prices, the ERP suggests we should primarily rely on an unrestrained free market that will increase corporate profits, crossing its fingers that such profits will result in greater innovation. Experience, however, shows that companies overwhelmingly distribute their profits to shareholders instead of reinvesting those funds into innovative research. From 2006-2015, U.S. pharmaceutical companies distributed 99 percent of their profits to shareholders through buybacks and dividends.[66] Just since the GOP tax bill passed, pharmaceutical companies have announced $50 billion in buybacks.[67]

The administration would also exacerbate a key market failure. The ERP suggests that consumers make their choices for prescription drugs largely on the basis of price and that consumers have perfect information about the prices and effectiveness of drugs. Relying upon this premise, the ERP argues that altering government reimbursement structures can shift pricing decisions and therefore potentially costs of drugs onto consumers and providers, driving prices down. For the ERP's conclusions to hold, health care consumers would need to have access to clear, complete information about medication costs, evaluate how different medications lead to different outcomes, and weigh the costs against the outcomes—all the while in the midst of a personal medical crisis or while managing the medical crisis of a loved one. Policymakers should be helping consumers afford the medicines that best meet their health needs, not making their decisions more costly and difficult.

CHAPTER 3: REPUBLICANS SHIFT RESPONSIBILITY TO STATES AND PRIVATE SECTOR

The ERP's chapter on infrastructure aligns closely with the administration's recently released infrastructure plan. The administration's long-awaited plan, finally announced on February 12, 2018, shifts responsibility for funding infrastructure onto the private sector and cash-strapped state and local governments.[68] It fails to make the necessary investments, is counteracted by proposed cuts to existing infrastructure programs in the president's budget, and will not fix our nation's crumbling infrastructure.

The administration plan rests on top of the ERP framework, which argues that the fundamental source of the nation's infrastructure problem is a mismatch between supply and demand, since the United States has not relied enough on price signals to moderate the consumption and provision of infrastructure. Infrastructure is often underpriced, or even free, the argument goes, which leads to excess demand and under supply.

The ERP stipulates that relying more on price signals and the private sector to provide a greater share of infrastructure, in response to these signals, will allocate resources to where infrastructure needs are greatest. However, this assumes a massive and unrealistic increase in the private provision of infrastructure. It also ignores the reality that some projects and communities will not be able to attract private investments despite great need, due to small populations, limited traffic, and other constraints that will limit private returns. Even residents in communities lucky enough to attract new infrastructure projects, in the Trump scheme, will likely face new tolls and other user fees that eat into family earnings.

Despite the administration characterizing its plan as a $1.5 trillion investment, a figure which is used throughout the ERP, it invests just $200 billion in federal dollars and proposes in its FY 2019 budget to offset these investments with cuts to existing infrastructure programs, including Community Development Block Grants, the Army Corp of Engineers, and the Highway Trust Fund.[69] The administration counts on the private sector and state and local governments to do the actual investing. Even assuming the $200 billion represents additional federal infrastructure spending—a generous assumption—the Penn Wharton Budget Model estimates that the administration's plan will result in net new infrastructure investment of between $20 billion and $230 billion, nowhere the $1.5 trillion promised.[70]

In addition, the plan rolls back environmental protections, shifting environmental review away from the Environmental Protection Agency to other agencies, and gives the private sector unprecedented control over the process.[71] Finally, by ignoring climate change, the administration's infrastructure plan risks building infrastructure that will not withstand the increased demands of a changing climate, which will lead to higher costs down the road.[72]

NEED FOR FEDERAL INVESTMENT IS CLEAR

Each day, Americans feel the effects of the nation's aging infrastructure. Congestion on the nation's roads and highways is wasting people's time, costing money, and harming the environment.[73] Households lose $3,400 a year in disposable income due to the impact of deteriorating infrastructure on productivity and economic growth.[74] Unsafe drinking water from aging water systems jeopardizes the health of millions.[75] And outdated schools fail to provide students with a modern learning environment.[76]

There is near universal agreement that the nation needs a major investment in upgrading and maintaining our infrastructure, and that current funding levels are not sufficient to meet the need. The United States invests less than it used to and less than its competitors. Public infrastructure investment has declined as a share of GDP – from 3.0 percent in 1959 to 2.4 percent in 2014.[77] Our nation's competitors now spend a much greater share of GDP on infrastructure, with China investing more than four times as much as the United States.[78]

Overall, more than $2 trillion above current spending levels is needed to restore our nation's infrastructure to good condition by 2025.[79] Surface transportation alone requires more than $1 trillion in investment.[80]

BENEFITS OF INVESTING IN INFRASTRUCTURE

There are significant economic benefits from investing in infrastructure, from lower transportation costs for businesses and consumers, to the creation of good-paying jobs and increased economic growth. In rural areas which are still recovering from the recession, the short-term positive economic impacts of infrastructure investments could help close gaps with the large cities that have been prospering.

Reduced transportation costs

The principal direct benefit of an effective transportation system is that it reduces transport costs for businesses and consumers. Those reduced costs, in turn, allow firms easier access to new markets, foster competition, spur innovation, raise productivity, relieve price pressures, and lead to increases in living standards.[81] The benefits from infrastructure investment are particularly pronounced for the manufacturing sector, which relies heavily on transportation networks for both raw material supply

lines and distribution networks to get products to customers.[82] Allowing transportation infrastructure to continue to fall into disrepair, on the other hand, in addition to harming businesses, places a significant debt on future generations through a backlog of deferred maintenance.[83]

Good-paying jobs

Investments in infrastructure create new jobs in manufacturing and construction, sectors that pay good wages and which were hit especially hard during the recent recession. Nearly 70 percent of jobs created from infrastructure investment are in construction, according to one analysis.[84] These jobs are governed by the Davis-Bacon Act, which ensures fair wages on federal construction contracts. It should be noted, however, that the administration's plan would exempt projects from Davis-Bacon, eroding wages on infrastructure projects.[85]

The 6.0 percent annual unemployment rate in construction in 2017 remains above the overall national rate of 4.4 percent, suggesting there is more room to increase jobs in the sector.[86] Creating jobs that pay good wages—the typical hourly wage for a construction worker is $30—would help both the employed workers and their local communities, as those wages will be plowed back into their local economy.[87] The ERP backs this up, noting that workers in occupations most likely to be involved in infrastructure projects have an unemployment rate well above the national rate.

Stimulating economic activity

Infrastructure investments can stimulate activity elsewhere in the economy. A survey of recent econometric estimates finds that infrastructure investments generate $1.40 to $1.80 in additional economic activity for every dollar invested.[88] The stimulative

effect on the economy would be especially important in rural communities, many of which are still recovering from the recession. The Center for American Progress estimates that increasing infrastructure spending by a total of $500 billion over 10 years would add 3.6 million new jobs, lower the unemployment rate by 1 percentage point, and increase the size of the economy by 3 percent.[89] However, the plan detailed by the administration would have "little to no impact on GDP," according to the Penn Wharton Budget Model, due to its negligible impact on total infrastructure investment.[90]

IT IS UNREALISTIC TO EXPECT STATES AND CITIES TO FOOT THE BILL

Despite the well-established benefits from federal investment in infrastructure, the Trump administration is seeking to shift the burden of investing in and maintaining infrastructure onto state and local governments.[91] On the one hand, the ERP acknowledges the investment and spending challenges facing state and local governments, reporting that state and local investment remains 20 percent below its peak in 2003.[92] On the other hand, the administration's plan assigns most of the responsibility for new infrastructure investments to these same state and local governments.

State and local governments are resource-constrained

State and local governments will be hard pressed to take on more infrastructure responsibilities. Already, state and local governments account for more than three-fourths of all transportation and water infrastructure spending.[93] And states are not awash in cash. Twenty-two states faced revenues shortfalls in 2017, partly a result of declining oil prices in energy-producing states and tax cuts in others.[94]

States also face about $1.1 trillion in unfunded pension liabilities, including three states with net liabilities exceeding $100 billion. This gap between assets in state pension funds and benefits owed to workers is expected to increase by $350 billion over two years.[95] States which face growing pension funding gaps may find it harder to issue debt to finance a range of projects, including infrastructure.[96]

The Republican tax bill adds new fiscal pressures

The Republican tax legislation will present new fiscal challenges for states in 2018, as deductions for state and local sales, income, and property taxes are capped at $10,000 in the new tax law. This will make it difficult for states to levy new taxes for increased infrastructure investments.

In addition, the Republican legislation increases the costs on states and municipalities of raising money for infrastructure through tax-exempt municipal bonds. By lowering the tax rate for wealthy individuals and corporations, both of whom are large investors in municipal bonds used to finance infrastructure projects, the legislation reduces the value of these tax-exempt bonds. States will have to pay higher rates to attract the same investment.[97]

Federal investment is key to modernizing infrastructure

Some states and communities are still recovering from the recent recession and are not well- positioned, by themselves, to make needed infrastructure investments. This is especially true in rural, less populated regions that have neither the resources nor the traffic to boost infrastructure investments.[98] As the economic gap between large and small communities continues to widen, relying on state and local governments to fund the overwhelming majority

of infrastructure may contribute to these communities falling further behind.

At the same time, all states face difficulties funding infrastructure during economic downturns because of balanced budget requirements and other fiscal constraints. Even if a state is able to increase funding for infrastructure when the economy is going well, this funding is often at risk during recessions when tax revenues fall and spending needs, such as unemployment insurance, increase.[99] Revenue fluctuations are especially challenging for the 22 states that fund infrastructure on a pay-as-you go basis rather than using a separate capital account that is exempt from balanced budget requirements.[100]

States and localities would underinvest because they do not capture all infrastructure benefits

Relying on state and local governments to drive investment could result in fewer interstate projects and investments that have broad regional benefits. The positive effects of an infrastructure project, including less congestion, more economic development, and higher tax revenues, often extend beyond municipal and state lines. One study found that only 20 percent of the total effects of public investment in U.S. highways occur in the state where the highway is located.[101] States and municipalities may be unwilling to foot the majority of the bill on a project where the benefits accrue mostly to other areas' residents, leaving many important projects unfunded in the Trump plan.

States and local governments are already investing heavily in infrastructure

State and local governments accounted for 77 percent of spending on transportation and water infrastructure in 2014, as noted in the

ERP, with the federal government's share of spending at 23 percent. State and local governments fund the overwhelming majority of operations and maintenance—88 percent in 2014— and their operations/maintenance spending was almost twice as great as their capital spending: $208 billion vs. $112 billion.[102]

The federal government's investments are concentrated in capital investments (investment in new equipment and structures or rehabilitation of existing structures/equipment). In 2014, the federal government spent more than twice as much on capital expenditures ($69 billion) as it did on operations and maintenance ($27 billion). Overall, the federal government accounted for 38 percent of capital investment in infrastructure in 2014.[103]

As infrastructure needs have grown over the past 35 years, federal investment in infrastructure has barely budged while state and local spending has nearly doubled. If the federal government invested the same amount as a share of GDP in 2014 as it did in 1980, it would have invested an additional $158 billion.[104]

Spending on infrastructure has also started to decline at the state and local levels over the past decade. From 2003 to 2014, state and local spending on infrastructure, after adjusting for inflation, declined by 5 percent and federal investment fell by 19 percent.[105] Reversing the federal decline, rather than asking the states to do more, should be a top priority.

State and Local Governments Already Carry Burden of Infrastructure Investment

Source: Congressional Budget Office
Note: 2014 dollars. Includes investment in water and transportation infrastructure

PUBLIC-PRIVATE PARTNERSHIPS

The Trump infrastructure plan relies heavily on public-private partnerships (P3s). Relying on a massive influx of new P3s is risky and ignores the significant gap between investors' motivations in financing infrastructure projects and the public interest. Even President Trump recently expressed reservations about relying on P3s according to a White House official who said, "He doesn't think they will work."[106]

P3s can make available additional resources to finance infrastructure, which is especially important when state and local budgets are strained. But there is a tension between the government's interests and those of private investors or operators.

The government wants to provide good transportation options, reduce congestion, and ensure that its infrastructure supports economic development, among other objectives. The private entity wants to maximize its profit. These interests sometimes overlap, but not always. And often, as seen in examples below, it is taxpayers who end up squeezed, paying new tolls, higher fees, and other charges levied by private companies.

There has been limited P3 success in United States

While the ERP highlighted a few P3s which have met their objectives, it's a small universe. Only 14 highway projects were completed using public-private partnerships between 1990 and 2014, according to the Congressional Budget Office. Three of the 14 declared bankruptcy.[107] One of the other completed projects, the Dulles Greenway, failed to meet revenue projections when fewer cars used the new road than had been projected. The contract had to be renegotiated.[108] Including all P3 highway projects either completed or underway during the past 25 years accounts for less than one percent spent on highways during this period, according to CBO.[109]

Previous analysis by JEC Democrats shows that financing infrastructure through tax credits to private investors can also cost nearly 55 percent more than traditional infrastructure financing.[110] In fact, because states are able to finance infrastructure projects relatively inexpensively through tax-exempt municipal bonds, the P3 market has been slower to develop in the United States than in other countries.

While there may be room to increase the usage of P3s in the United States, it is unrealistic to expect a large enough increase in projects to account for the level of investment that the economy needs or the administration is promising. It takes time for state and local

agencies to develop expertise and processes for bidding out, selecting, implementing, and operating a partnership.[111] As the ERP notes, about one-third of states do not even have legislation on the books authorizing the use of P3s for transportation infrastructure. As past projects have demonstrated, they are only successful in particular circumstances, as well.

Many important projects would be ignored by the private sector

Relying on private investors to address the nation's growing infrastructure needs means that many important projects that do not deliver returns attractive to investors simply would not happen. For example, a highway serving rural areas with little traffic would not be able to generate the toll revenue needed to attract private investment. Urgent repairs and maintenance are also unlikely to satisfy investors' demand for high returns and would go unfunded. Yet, as CBO has reported and the ERP acknowledged, these repair projects often do best in cost/benefit analyses.[112] It is estimated that close to $200 billion annually is needed just to maintain the nation's road and bridges.[113] Adding tolls to existing roads in order to draw in private entities willing to repair and maintain them would be an unpopular approach.

In addition, P3s are not well suited to the smaller scale projects that states target as priorities. The average state project is less than $20 million and often is focused on repairs and fixes of existing infrastructure. For example, Arkansas's average cost of highway and transit projects is $5.6 million.[114]

P3s are often anti-competitive

The long terms of some P3 agreements, sometimes up to 99 years, can limit the options of policymakers well into the future. These agreements may include non-compete clauses which limit

improvements to existing infrastructure near a P3-operated road or prohibit the construction of additional transportation options.[115] The lack of competition allows the operating company to raise toll rates substantially once the project is up and running. This has already played out in the relatively limited U.S. experience with P3s. For example, costs on the Indiana Toll Road, operated under a P3 agreement, jumped from $4.65 to $8.00 for a car travelling the whole road.[116] Federal taxpayers can also be exposed to risk. Since many P3s receive federal loans through the Transportation Infrastructure Finance and Innovation Act (TIFIA), federal taxpayers can be on the hook if the private entity is unable to service the loans.[117]

Despite the limited experience with P3s, challenges already encountered are instructive. To minimize risks, investors often negotiate deals that leave the public exposed to the costs of any hiccups, involve punitive non-compete clauses, or constrain the decision making of future elected officials. P3s have led to tolls and higher taxpayer expenses on projects in a number of states, including Illinois, California, Indiana and Virginia.[118]

Roll back of environmental protections

The Trump infrastructure plan also poses dangers for the environment. In fact, the ERP dismisses environmental reviews, as well as prevailing wage and Buy America provisions, as simply "potential costs." It fails to consider the benefits of protecting the environment, paying workers a fair wage, and requiring that steel, iron, and other products used in infrastructure are made in the United States.

With its one-agency review proposal, the administration would eliminate the Environmental Protection Agency's ability to review environmental impact statements from other agencies. The EPA

has the knowledge in the federal government to protect water, wetlands and air quality but it won't be able to put that knowledge to work. In addition, the administration's plan makes it more difficult to file challenges to permitting decisions by limiting the statute of limitations to 150 days. Most egregiously, developers will be able to pay for the environmental review of their projects and select the firms that conduct those reviews.[119]

CHAPTER 4: TRUMP REGULATORY AGENDA PUTS SPECIAL INTERESTS AHEAD OF WORKERS

The ERP chapter "Deregulation that Frees the Economy" points out, correctly, that regulation can benefit the economy and the American people, but poorly designed or outdated regulation can cause harm, particularly when regulated industries gain control of the regulatory process and use it to discourage competition. Unfortunately, the chapter goes on to defend the administration's overly simplistic approach to deregulation, which seems more driven by the influence of special interests than by a proper consideration of costs and benefits to all Americans, often ignoring the interests of workers and consumers.

The ERP appears to agree with the findings of the previous administration's CEA on the detrimental impacts of overly restrictive local zoning laws and state occupational licensing, but bizarrely attempts to connect these problems with the current administration's haphazard dismantling of unrelated federal regulations. It also concedes that the evidence on regulation and jobs is ambiguous. The ERP also highlights a central issue facing the American economy, decreased competition, but it connects the problem to overregulation without presenting any robust evidence linking regulation and increased market concentration.

Strengthening existing policies to guarantee competitive markets and to mandate unbiased review of regulations will address the underlying problems in our economy in ways that a blind and corruptible process of arbitrary deregulation cannot.

The administration's regulatory agenda hurts workers

Favored industries are clearly the winner in the Trump deregulation agenda. On the other side of the coin are working families, who are seeing protections erode in critical areas. For example, the administration worked to reverse an increase in the overtime threshold. With the increase, 4 million workers would have seen a collective $1.2 billion in additional wages per year— a raise that is sorely needed at a time when wages are barely rising.[120] More recently, the administration has proposed to end protections that ensure workers earning tips get to keep them, opening up the possibility for higher-paid management to take those tips.[121] The administration even withheld from the public a Department of Labor analysis that reportedly showed workers could lose billions of dollars as a result of the proposed rule change.[122]

Congressional Republicans and President Trump have also undone worker safety protections, including rules assuring miners of a safe workplace, allowing OSHA to cite employers for not tracking injuries, and preventing exposure to toxic chemicals.[123] The administration put a stop to a change that would have required large employers to provide information on pay by gender, race, and ethnicity, making it harder to combat illegal wage discrimination.[124]

The administration is failing to enforce the law of the land

In addition to trying to undo important protections for workers, the administration is failing to enforce regulations that are the law of the land. From the very beginning, the administration has filled key regulatory posts with individuals hostile to the agencies that they are now leading. For example, Jay Clayton was appointed as

the chair of the Securities and Exchange Commission (SEC). His prior experience was as a Wall Street lawyer known for battling the SEC, and his appointment has stifled the enforcement and oversight action that historically has protected investors from reckless behavior.[125]

The appointment of White House Budget Director Mick Mulvaney to lead the Consumer Financial Protection Bureau at first created confusion at an agency he has consistently condemned and has quickly led to delayed implementation of rules, such as payday lending regulation, and a shift from the agency's stated mission in order to emphasize deregulation.[126] The appointment of Mulvaney, which bypasses the 2010 Dodd-Frank Wall Street Reform and Consumer Protection Act rules, undermines the Bureau's independence and hampers its supervisory authority and enforcement actions against predatory lending practices.

INCREASING MARKET CONCENTRATION IS A PROBLEM IN NEED OF REAL SOLUTIONS

The ERP frames the president's attacks on federal regulation in the past year as an attempt to solve a real problem of the American economy: the increase in market concentration since the 1980s. Increasing market concentration has been identified as one of the causes of the decades-long stagnation in business dynamism, productivity and wages.[127] The administration's regulatory actions are unlikely to solve this problem, though, and, more likely, will exacerbate it.

Without a doubt, the last few decades have witnessed an alarming rise in market concentration in the U.S. economy. Researchers have found that industries across the board are seeing less competition and increasingly are being dominated by just a few large companies. This is concerning because increased

concentration allows firms to exercise monopolistic tendencies to capture economic rents, meaning that they can charge higher prices and pay workers less than they would in a competitive market.[128]

While many factors, including technological change, have contributed to the pervasive increase in market concentration, the most obvious culprit is the movement in the 1970s and 1980s away from using federal antitrust laws to prevent market concentration. Instead of focusing broadly on competition in a market, antitrust efforts moved towards a narrow view that homed in on impacts to consumers. Under this new approach, as long as firms could show that their market share would not result in higher consumer prices, they would generally avoid regulatory intervention. This allowed firms to gain substantial market share as long as they pledged to keep prices down, even if it hurt overall competition.[129]

ROBUST AND IMPARTIAL COST-BENEFIT ANALYSES ARE KEY TO SMART REGULATION

Fortunately, better solutions already exist, and can be further strengthened to deal with the challenges of today and tomorrow. The keys to efficient and fair regulatory policies are to weigh the costs and benefits of regulation in a complete and impartial way, and to maintain the flexibility necessary to learn from experience and adapt to changing economic conditions. One of the solutions to this challenge can be found in the Better Deal plan, which addresses the lessons of the last few decades of antitrust policy and outlines a proposal to restore the original emphasis on concentration rather than just consumer prices. The American people have interests not just as consumers, but also as workers and potential entrepreneurs, in the guarantee of free, fair, and competitive markets.

Another part of the solution is the previous administration's executive orders mandating regulatory review for all agencies and regulations. An impartial and standardized process for reviewing regulations in an unbiased manner is the only way that regulation or deregulation will result in a more efficient interaction between the federal government and the U.S. economy.

In addition to ex-ante analysis of proposed regulations, conducting a follow-up review on a specified timeframe to ensure that the regulation remains relevant and effective and that the costs and benefits have turned out to be as expected is a sensible solution. In this way, the process of minimizing compliance costs and avoiding duplication or outdated regulation could proceed on a continuous basis, without depending on the favoritism or political interests of the current executive branch.

By learning from the past and making reasonable assumptions about the future, the process of regulating and deregulating economic activity in the United States can be made to work in the interests of competition, efficiency, and the wellbeing of all Americans. Increased growth in an economy that is both freer and fairer can be achieved, and the way to get there is not through simply pursuing "more" or "less" regulation, but instead through an impartial and intelligent approach towards both proposed and existing regulatory actions which puts the interests of the American people first.

ENDNOTES

[1] Matishak, Martin. "Trump hasn't directed NSA chief to strike back at Russian hackers." Politico. February 27, 2018. https://www.politico.com/story/2018/02/27/trump-russia-hackers-nsa-response-368241

[2] U.S. Census Bureau and U.S. Bureau of Economic Analysis, "U.S. International Trade in Goods and Services." Released February 6, 2018. https://www.bea.gov/newsreleases/international/trade/2018/pdf/trad1217.pdf and Reuters. "Soaring imports push U.S. trade deficit to a 9-year high." February 6, 2018. https://www.cnbc.com/2018/02/06/soaring-imports-push-us-trade-deficit-to-nine-year-high.html

[3] Federal Reserve. FOMC Projection materials. December 13, 20172016 Q3. https://www.federalreserve.gov/monetarypolicy/fomcprojtabl20171213.htm and Congressional Budget Office. "An Update to the Budget and Economic Outlook: 2017 to 2027." June, 2017. https://www.cbo.gov/system/files/115th-congress-2017-2018/reports/52801-june2017outlook.pdf Office of Management and Budget. "Economic Assumptions and Interactions with the Budget." https://www.whitehouse.gov/wp-content/uploads/2018/02/ap_2_assumptions-fy2019.pdf

[4] Irwin, Neil. "The White House Is Very Optimistic on Growth. It Shouldn't Be." New York Times. February 14, 2018. https://www.nytimes.com/2018/02/14/upshot/the-trump-administration-is-optimistic-about-economic-growth-be-skeptical.html

[5] JEC Calculations. Average annual growth (Q4 to Q4) from 2001 – 2017 is 1.87 percent.

[6] U.S. Bureau of Economic Analysis. "Real Gross Domestic Product and Related Messures." Table 1 of release. January 26, 2018. https://www.bea.gov/newsreleases/national/gdp/2018/pdf/gdp4q17_adv.pdf

[7] Congressional Budget Office. "The Budget and Economic Outlook." January, 2017. Page 120. https://www.cbo.gov/sites/default/files/115th-congress-2017-2018/reports/52370-outlookonecolumn.pdf

[8] Sprague, Shawn. "Below trend: the U.S. productivity slowdown since the Great Recession." Bureau of Labor Statistics. January, 2017. Average annual labor productivity growth between 2007 Q4 and Q3 2016. https://www.bls.gov/opub/btn/volume-6/below-trend-the-us-productivity-slowdown-since-the-great-recession.htm

[9] Gault, Barbara; Hartmann, Heidi; Hegewisch, Ariane; Milli, Jessica; Reichlin, Lindsey. "Paid Parental Leave in the United States." Institute for Women's Policy Research. March, 2014.

https://www.dol.gov/wb/resources/paid_parental_leave_in_the_united_states.pdf

[10] Reuters. "U.S. corporate share buybacks 'explode' in February." February 28, 2018. https://www.reuters.com/article/us-usa-tax-buybacks/u-s-corporate-share-buybacks-explode-in-february-research-firm-idUSKCN1GC3BD and Egan, Matt. "Tax Cut Scoreboard: Workers $6 billion; Shareholders $171 billion. CNN Money. February 16, 2018. http://money.cnn.com/2018/02/16/investing/stock-buybacks-tax-law-bonuses/index.html

[11] See for instance Page, Benjamin R.; Rose, Joseph; Nunns, James R.; Rohaly, Jeffrey; Berger, Daniel. "Macroeconomic Analysis of the Tax Cuts and Jobs Act as Passed by the House of Representatives." Tax Policy Center: http://www.taxpolicycenter.org/publications/macroeconomic-analysis-tax-cuts-and-jobs-act-passed-house-representatives/full

[12] Federal Reserve Bulletin. "Changes in U.S. Family Finances from 2013 to 2016: Evidence from the Survey of Consumer Finances. September, 2017. https://www.federalreserve.gov/publications/files/scf17.pdf

[13] Tax Policy Center. "Current Law Distribution of Gross Estate and Net Estate Tax by Size of Gross Estate, 2017." October 27, 2017. http://www.taxpolicycenter.org/model-estimates/baseline-estate-tax-tables-2017/t17-0230-current-law-distribution-gross-estate-and

[14] Joint Committee on Taxation. "JCX-67-17." https://www.jct.gov/publications.html?func=startdown&id=5053

[15] http://www.taxpolicycenter.org/model-estimates/conference-agreement-tax-cuts-and-jobs-act-dec-2017/t17-0318-major-provisions

[16] Ng, Michael and Wessel, David. "The Hutchins Center Explains: The Chained CPI." Brookings Institution. December 7, 2017. https://www.brookings.edu/blog/up-front/2017/12/07/the-hutchins-center-explains-the-chained-cpi/

[17] Tax Policy Center. "Model Estimates: T17-0318 - Major Provisions in Conference Agreement: The Tax Cuts and Jobs Act; Tax Units with a Tax Increase or Tax Cut, by Expanded Cash Income Percentile, 2018; Baseline: Current Law." December 18, 2017. http://www.taxpolicycenter.org/model-estimates/conference-agreement-tax-cuts-and-jobs-act-dec-2017/t17-0322-major-provisions

[18] Tax Policy Center. "Modes Estimates: T17-0316 - Conference Agreement: The Tax Cuts and Jobs Act; Baseline: Current Law; Distribution of Federal Tax Change by Expanded Cash Income Percentile, 2027." December 18, 2017. http://www.taxpolicycenter.org/model-estimates/conference-agreement-tax-cuts-and-jobs-act-dec-2017/t17-0316-conference-agreement

[19] Cingano, Federico. "Trends in Income Inequality and its Impact on Economic Growth." OECD Social, Employment and Migration Working Papers No 163. OECD Publishing. 2014. http://www.oecd.org/els/soc/trends-in-income-inequality-and-its-impact-on-economic-growth-SEM-WP163.pdf

[20] Marr, Chuck; Huang, Chye-Ching; Sherman, Arloc and Debot, Brandon. "EITC and Child Tax Credit Promote Work, Reduce Poverty, and Support Children's Development, Research Finds." Center on Budget and Policy Priorities. October 1, 2015. https://www.cbpp.org/research/federal-tax/eitc-and-child-tax-credit-promote-work-reduce-poverty-and-support-childrens

[21] Barnett, Steven W. and Friedman-Krauss. "State(s) of Head Start." National Institute for Early Education Research. 2016. http://nieer.org/wp-content/uploads/2016/12/HS_Full_Reduced.pdf

[22] Whalen, Charles W. "The Fiscal Multiplier and Economic Policy Analysis in the United States." Congressional Budget Office. February, 2015. https://www.cbo.gov/sites/default/files/114th-congress-2015-2016/workingpaper/49925-FiscalMultiplier_1.pdf

[23] Joint Economic Committee Democrats. "Economists Dismiss CEA Findings." October, 25, 2017. https://www.jec.senate.gov/public/index.cfm/democrats/blog?ID=F2B4C5D2-1C33-4E95-8F94-9A307DE8B4D9

[24] Joint Committee on Taxation. JCX-14-13 https://www.jct.gov/publications.html?func=startdown&id=4528; Tax Policy Center. "Briefing Book: Who bears the burden of the corporate income tax?" http://www.taxpolicycenter.org/briefing-book/who-bears-burden-corporate-income-tax

[25] Sanchez, Louis. "Survey: Analysts expect 13 percent of business tax-cut savings to go to workers." The Hill. February 10, 2018. http://thehill.com/policy/finance/373280-survey-analysts-expect-13-percent-of-business-tax-cut-savings-to-go-to-workers; Zaretsky, Renu. "Will the Tax Cut and Jobs Act grow U.S. businesses?" Tax Policy Center. February 7, 2018. http://www.taxpolicycenter.org/taxvox/will-tax-cuts-and-jobs-act-grow-us-businesses

[26] Mui, Ylan. "Democrats slam Republican tax cut for $97 billion wave in corporate share buybacks." CNBC. February 7, 2018. https://www.cnbc.com/2018/02/07/companies-ramp-up-stock-buybacks-following-passage-of-tax-law.html

[27] Economic Policy Institute. "The Productivity-Pay Gap." Updated October 2017. https://www.epi.org/productivity-pay-gap/

[28] Council of Economic Advisers Issue Brief. "Labor Market Monopsony: Trends, Consequences, and Policy Responses." October, 2016. https://obamawhitehouse.archives.gov/sites/default/files/page/files/20161025_monopsony_labor_mrkt_cea.pdf

[29] Paletta, Damian. "Expiring provisions threaten to upend promised tax relief." Washington Post. November 22, 2017. https://www.washingtonpost.com/business/economy/expiring-provisions-threaten-to-upend-promised-tax-relief/2017/11/22/bd234e60-ced6-11e7-81bc-c55a220c8cbe_story.html?utm_term=.57b8d1178d9f

[30] Kamin, David; Gamage, David; Glogower, Ari D.; Kysar, Rebecca M.; Shanske, Darien; Avi-Yonah, Reuven S.; Batchelder, Lily L.; Fleming, J. Clifton; Hemel, Daniel Jacob; Kane, Mitchell; Miller, David S.; Shaviro, Daniel; Viswanathan, Manoj. "The Games They Will Plan: Tax Games, Roadblocks, and Glitches Under the New Legislation." SSRN. December 7, 2017. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3084187

[31] Centers on Medicare and Medicaid Services. "National Health Expenditures 2016 Highlights." https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/Downloads/highlights.pdf

[32] JEC Democratic Staff analysis based on data from U.S. Census Bureau, Current Population Survey, Annual Social and Economic Supplements.

[33] JEC Democratic Staff analysis based on data from U.S. Census Bureau, Current Population Survey, Annual Social and Economic Supplements.

[34] 2017 Economic Report of the President. "Chapter 4: Reform the Health Care System." January 2017. https://obamawhitehouse.archives.gov/sites/default/files/docs/chapter_4-reforming_health_care_system_2017.pdf

[35] 2017 Economic Report of the President. "Chapter 4: Reform the Health Care System." January 2017. https://obamawhitehouse.archives.gov/sites/default/files/docs/chapter_4-reforming_health_care_system_2017.pdf

[36] 2017 Economic Report of the President. "Chapter 4: Reform the Health Care System." January 2017. https://obamawhitehouse.archives.gov/sites/default/files/docs/chapter_4-reforming_health_care_system_2017.pdf

[37] Topchik, Michael. "Rural Relevance 2017: Assessing the State of Rural Healthcare in America." 2017. https://www.chartisforum.com/wp-content/uploads/2017/05/The-Rural-Relevance-Study_2017.pdf

[38] Sommers, Benjamin D.; Gawande, Atul A.; Baicker, Katherine. "Health Insurance Coverage and Health – What the Recent Evidence Tells Us." August 10, 2017. http://www.nejm.org/doi/full/10.1056/NEJMsb1706645

[39] Sommers, Benjamin D.; Baicker, Katherine; Epstein, Arnold M.. "Mortality and Access to Care among Adults after State Medicaid Expansions. September 13, 2017. http://www.nejm.org/doi/full/10.1056/NEJMsa1202099

[40] Sommers, Benjamin D.; Gawande, Atul A.; Baicker, Katherine. "Health Insurance Coverage and Health – What the Recent Evidence Tells Us." August 10, 2017. http://www.nejm.org/doi/full/10.1056/NEJMsb1706645

[41] Hu, Luojia; Kaestner, Robert; Mazumder, Bhashkar; Miller, Sarah; Wong, Ashley. "The Effect of the Patient Protection and Affordable Care Act Medicaid Expansions on Financial Wellbeing." February 2018. http://www.nber.org/papers/w22170.pdf

[42] Congressional Budget Office. "Cost Estimate: H.R. 1628 Better Care Reconciliation Act of 2017 – An Amendment in the Nature of a Substitute

[LYN17343] as Posted on the Website of the Senate Committee on the Budget on June 26, 2017." June, 26, 2017. https://www.cbo.gov/system/files/115th-congress-2017-2018/costestimate/52849-hr1628senate.pdf

[43] Kliff, Sarah. "How Cassidy-Graham Brings Back Preexisting Conditions." September 18, 2017. https://www.vox.com/policy-and-politics/2017/9/18/16330574/cassidy-graham-preexisting-conditions

[44] Berger, Sam; Gee, Emily. "Graham-Cassidy ACA Repeal Bill Would Cause Huge Premium Increases for People with Pre-Existing Conditions." September 18, 2017. https://www.americanprogress.org/issues/healthcare/news/2017/09/18/439091/graham-cassidy-aca-repeal-bill-cause-huge-premium-increases-people-pre-existing-conditions/

[45] Congressional Budget Office. "The Effects of Terminating Payments for Cost-Sharing Reductions." August 2017. https://www.cbo.gov/system/files/115th-congress-2017-2018/reports/53009-costsharingreductions.pdf; and Democratic Staff of the Joint Economic Committee. "Republican Health Care Sabotage, Inc. Invoice." October 17, 2017. https://www.jec.senate.gov/public/_cache/files/c68b9021-b3bf-4fa0-92e1-fef96f88c91f/republican-health-care-invoice.pdf

[46] Congressional Budget Office. "Repealing the Individual Health Insurance Mandate: An Updated Estimate." November 8, 2017. https://www.cbo.gov/publication/53300

[47] Peck, Joshua. "Trump's Ad Cuts Will Cost a Minimum of 1.1 Million Obamacare Enrollments." October 23, 2017. https://medium.com/get-america-covered/trumps-ad-cuts-will-cost-a-minimum-of-1-1-million-obamacare-enrollments-9334f35c1626

[48] The Kaiser Family Foundation. "National ACA Marketplace Signups Dipped a Modest 3.7 Percent This Year." February 7, 2018. https://www.kff.org/health-reform/press-release/national-aca-marketplace-signups-dipped-a-modest-3-7-percent-this-year/

[49] Anthem Press Release. "Anthem Statement on Individual Market Participation in Nevada." August 7, 2017. https://www.anthem.com/press/nevada/anthem-statement-on-individual-market-participation-in-nevada/

[50] Sullivan, Peter. "Blue Cross Blue Shield Sees 'Urgent' Need for Congress to Stabilize ObamaCare Markets." February 5, 2018. http://thehill.com/policy/healthcare/372366-blue-cross-blue-shield-sees-urgent-need-for-congress-to-stabilize-obamacare

[51] JEC Democratic Staff analysis based on data from the Kaiser Family Foundation. Assumes a 27 percent reduction in premiums under a stabilization package based on analysis conducted of Blue Cross Blue Shield. Estimates use the average benchmark premium for a 40-year-old.

[52] Congressional Budget Office. "Longer-Term Effects of the Better Care Reconciliation Act of 2017 on Medicaid Spending." June 2017.

https://www.cbo.gov/system/files/115th-congress-2017-2018/reports/52859-medicaid.pdf

[53] Office of Management and Budget 2019 Budget of the U.S. Government. "Efficient, Effective, Accountable: An American Budget: Major Savings and Reforms." February 2018. https://www.whitehouse.gov/wp-content/uploads/2018/02/msar-fy2019.pdf

[54] Democratic Staff of the Joint Economic Committee. "Medicaid Requirements Just Don't Work." January 12, 2018. https://www.jec.senate.gov/public/index.cfm/democrats/blog?ID=4A669024-7CB4-4186-B368-FD819931C3B2

[55] Artiga, Samantha; Ubri, Petry; Zur, Julia. "The Effects of Premiums and Cost Sharing on Low-Income Populations. Updated Review of Research Findings." June 1, 2017. https://www.kff.org/medicaid/issue-brief/the-effects-of-premiums-and-cost-sharing-on-low-income-populations-updated-review-of-research-findings/

[56] National Women's Law Center. "New Data Estimate 62.4 Million Women Have Coverage of Birth Control without Out-of-Pocket Costs." September 25, 2017. https://nwlc.org/resources/new-data-estimate-62-4-million-women-have-coverage-of-birth-control-without-out-of-pocket-costs/; and CostHelper Health. "Birth Control Pills Cost." http://health.costhelper.com/birth-control-pills.html. Cost estimate assumes a cost of $50 per month over 12 months.

[57] National Women's Law Center. "The Stealth Attack on Women's Health: Medicaid Work Requirements Would Reduce Access to Care for Women Without Increasing Employment." May 22, 2017. https://nwlc.org/resources/the-stealth-attack-on-womens-health-medicaid-work-requirements-would-reduce-access-to-care-for-women-without-increasing-employment/; Kaiser Family Foundation. "Understanding the Intersection of Medicaid and Work." December 7, 2017. https://www.kff.org/medicaid/issue-brief/understanding-the-intersection-of-medicaid-and-work/

[58] Democratic Staff of the Joint Economic Committee. "TrumpCare Threatens Rural Hospitals, Jeopardizes Health of Older Americans, and Hurts Rural Economies." June 20, 2017. https://www.jec.senate.gov/public/_cache/files/c875b293-aa4e-410e-84e6-485963ca5cbc/medicaid-rural-hospitals-and-seniors.pdf

[59] Council of Economic Advisors. "Economic Report of the President." February 2018. https://www.whitehouse.gov/wp-content/uploads/2018/02/ERP_2018_Final-FINAL.pdf

[60] Gee, Emily; and Frank, Richard G. "Senate's Opioid Fund Cannot Substitute for Health Coverage." June 20, 2017. https://www.americanprogress.org/issues/healthcare/news/2017/06/20/434708/senates-opioid-fund-cannot-substitute-health-coverage/

[61] IMS Institute for Healthcare Informatics. "Use of Opioid Recovery Medications." September 2016. https://www.iqvia.com/-

/media/iqvia/pdfs/institute-reports/use-of-opioid-recovery-medications.pdf?la=en&hash=A0AEB9DE498D46FED720F37C4151533050 4F4DC3&_=1512751526251 ; Medicaid share of MAT refers to Medicaid share of payments for Buprenorphine, a commonly used drug for the treatment of prescription opioid and heroin addiction.

[62] Frank, Richard; and Glied, Sherry. "Keep Obamacare to Keep Progress on Treating Opioid Disorders and Mental Illnesses." January 11, 2017, http://thehill.com/blogs/pundits-blog/healthcare/313672-keep-obamacare-to-keep-progress-on-treating-opioid-disorders with data from https://www.hcp.med.harvard.edu/sites/default/files/Key%20state%20SMI-OUD%20v3corrected.pdf and https://www.hcp.med.harvard.edu/sites/default/files/Interpretation%20of%20 Tables%20SMI-SUD%20162016%20v2.pdf; and U.S. Department of Health and Human Services, Assistant Secretary for Planning and Evaluation (ASPE). "Continuing Progress on the Opioid Epidemic: The Role of the Affordable Care Act." ASPE Issue Brief. January 11, 2017. https://aspe.hhs.gov/system/files/pdf/255456/ACAOpioid.pdf

[63] Center for Budget and Policy Priorities. "How Medicaid Work Requirements Will Harm Older Americans." February 20, 2018. https://www.cbpp.org/research/health/how-medicaid-work-requirements-will-harm-older-americans

[64] Meara, Ellen and Frank, Richard. "Welfare Reform, Work Requirements, and Employment Barriers." August 2006. http://www.nber.org/papers/w12480.pdf

[65] Yu, Nancy; Helms, Zachary, Bach, Peter. "R&D Costs for Pharmaceutical Companies Do Not Explain Elevated US Drug Prices." March 7, 2017. https://www.healthaffairs.org/do/10.1377/hblog20170307.059036/full/

[66] Lazonick, William; Hopkins, Matt; Jacobson, Ken; Erdem Sakinc, Mustafa; Tulum, Oner. "US Pharma's Financialized Business Model." July 13, 2017. https://www.ineteconomics.org/uploads/papers/WP_60-Lazonick-et-al-US-Pharma-Business-Model.pdf

[67] Herman, Bob. "Pharma's $50 Billion Tax Windfall for Investors." February 22, 2018. https://www.axios.com/pharma-share-buyback-tax-reform-40a30b93-6149-4c67-bd65-cd05ee814215.html

[68] Reuters. "Trump administration's infrastructure plan takes shape, focusing on state, local, and private financing." January 18, 2018. https://www.cnbc.com/2018/01/18/trump-administrations-infrastructure-plan-takes-shape-focusing-on-state-local-and-private-financing.html and Wagner, John. "After cutting taxes, Trump looking to localities to raise revenue for infrastructure." Washington Post. December 7, 2017. https://www.washingtonpost.com/politics/after-cutting-taxes-trump-looking-to-localities-to-raise-revenue-for-inftrastructure/2017/12/06/9078c230-d379-11e7-b62d-d9345ced896d_story.html?utm_term=.6513debb7c67

[69] Lowy, Joan and Miller, Zeke. "Trump's infrastructure plan comes with a huge hole." Associated Press. January 26, 2018. https://www.apnews.com/37a9cd31c19f45018840b15d6b15454e/Trump's-infrastructure-plan-comes-with-a-huge-hole?utm_campaign=SocialFlow&utm_source=Twitter&utm_medium=AP_P olitic and DPCC. "Six Facts You Need to Know about the Trump Toll Plan." https://www.democrats.senate.gov/imo/media/doc/Six%20Things%20You%2 0Need%20to%20Know%20About%20the%20Trump%20Toll%20Plan.pdf

[70] Penn Wharton Budget Model. "The White House FY 2019 Infrastructure Plan." February 22, 2018. http://budgetmodel.wharton.upenn.edu/issues/2018/2/19/the-white-house-infrastructure-plan

[71] The White House. "Legislative Outline for Rebuilding Infrastructure in America." https://www.politico.com/f/?id=00000161-8aef-d53a-a5f5-bfff42500002

[72] Davenport, Coral. "Trump's Infrastructure Plan May Ignore Climate Change. It Could Be Costly." February 10, 2018. https://www.nytimes.com/2018/02/10/climate/trump-infrastructure-climate-change.html

[73] Bak, Jim, Bill Eisele, Tim Lomax and David Schrank. "2015 Urban Mobility Scorecard." Texas A & M Transportation Institute and INRIX. August, 2015. https://mobility.tamu.edu/ums/report/ http://d2dtl5nnlpfr0r.cloudfront.net/tti.tamu.edu/documents/mobility-scorecard-2015.pdf

[74] American Society of Civil Engineers. "Failure to Act: Closing the Infrastructure Investment Gap for America's Economic Future." 2016. http://www.infrastructurereportcard.org/wp-content/uploads/2016/05/2016-FTA-Report-Close-the-Gap.pdf

[75] Fedinick, Kristi Pullen and Olson, Eric. "What's in Your Water? Flint and Beyond: Analysis of EPA Data Reveals Widespread Lead Crisis Potentially Affecting Millions of Americans," Natural Resources Defense Council. June, 2016. https://www.nrdc.org/sites/default/files/whats-in-your-water-flint-beyond-report.pdf

[76] American Society of Civil Engineers. "2017 Infrastructure Report Card." https://www.infrastructurereportcard.org/wp-content/uploads/2017/01/Schools-Final.pdf

[77] Congressional Budget Office. "Public Spending on Transportation and Water Infrastructure 1956 to 2014. March, 2015. https://www.cbo.gov/sites/default/files/114th-congress-2015-2016/reports/49910-infrastructure.pdf

[78] U.S. Treasury Department. "A New Economic Analysis of Infrastructure Investment." March 23, 2012. https://www.treasury.gov/resource-center/economic-policy/Documents/20120323InfrastructureReport.pdf

[79] American Society of Civil Engineers. "2017 Infrastructure Report Card." https://www.infrastructurereportcard.org/wp-content/uploads/2016/10/2017-Infrastructure-Report-Card.pdf

[80] American Society of Civil Engineers. "2017 Infrastructure Report Card." https://www.infrastructurereportcard.org/wp-content/uploads/2016/10/2017-Infrastructure-Report-Card.pdf U.S.

[81] Henckel, Timo, and Warwick McKibbin, "The Economics of Infrastructure in a Globalized World: Issues, Lessons and Future Challenges." Brookings Institution, June 4, 2010. https://www.brookings.edu/research/the-economics-of-infrastructure-in-a-globalized-world-issues-lessons-and-future-challenges/

[82] Wilkerson, Chad. "Trends in Rural Manufacturing." Center for the Study of Rural America Federal Reserve Bank of Kansas City. December, 2001. https://www.kansascityfed.org/publicat/mse/MSE_1201.pdf and Council of Economic Advisers. "An Economic Analysis of Transportation Infrastructure Investment." July, 2014. https://obamawhitehouse.archives.gov/sites/default/files/docs/economic_analysis_of_transportation_investments.pdf

[83] Klein, Ezra, "Now is the time to be an infrastructure hawk, not a deficit hawk," *The Washington Post*, June 5, 2013. https://www.washingtonpost.com/news/wonk/wp/2013/06/05/now-is-the-time-to-be-an-infrastructure-hawk-not-a-deficit-hawk/?utm_term=.8ca948d9d943.

[84] 2016 Economic Report of the President. Council of Economic Advisers. February 2016. Page 264. https://www.gpo.gov/fdsys/pkg/ERP-2016/pdf/ERP-2016.pdf

[85] The White House. "Legislative Outline for Rebuilding Infrastructure in America." https://www.politico.com/f/?id=00000161-8aef-d53a-a5f5-bfff42500002 and DPCC, "Six Facts You Need to Know about the Trump Toll Plan." https://www.democrats.senate.gov/imo/media/doc/Six%20Things%20You%20Need%20to%20Know%20About%20the%20Trump%20Toll%20Plan.pdf

[86] Bureau of Labor Statistics annual 2017 data.

[87] Bureau of Labor Statistics and Industries at a glance: Heavy and Civil Engineering Construction. https://www.bls.gov/iag/tgs/iag237.htm

[88] Zandi, Mark. "Doing Infrastructure the Right Way." Moody's Analytics. November 2, 2011 https://www.economy.com/dismal/analysis/free/226001 ; Chodorow-Reich, Gabriel. "What Have We Learned about Geographic Cross-sectional Fiscal Multipliers?" Washington Center for Equitable Growth. January 24, 2017 http://equitablegrowth.org/economic-stability/what-have-we-learned-about-geographic-cross-sectional-fiscal-multipliers/ ; "Bivens, Josh. "The Short and Long-Term Impact of Infrastructure Investments on Employment and Economic Activity in the U.S. Economy." Economic Policy Institute. July 1, 2014. http://www.epi.org/publication/impact-of-infrastructure-investments/ CEA, Moody's and CBO multipliers from mid-

recovery range from 1.8 (CBO), 1.6 (Moody's Analytics Economy.com) and 1.5 (CEA). See Table 4.

[89] DeGood, Kevin; Schwartz, Andrew; Weller, Christian. "An Infrastructure Plan for America: How Investing in Infrastructure Will Lay the Foundation for Prosperity, Advance Environmental Goals, and Rebuild the Middle Class." Center for American Progress. July, 2016. https://cdn.americanprogress.org/wp-content/uploads/2016/07/12141150/2016-Infrastructure-report-singles.pdf

[90] Penn Wharton Budget Model. "The White House FY 2019 Infrastructure Plan." February 22, 2018. http://budgetmodel.wharton.upenn.edu/issues/2018/2/19/the-white-house-infrastructure-plan

[91] White, Ben. "Democrats to Trump on Infrastructure: Show us the Money." Politico. January 17, 2018. https://www.politico.com/story/2018/01/17/carper-trump-infrastructure-money-289342

[92] 2018 Economic Report of the President. February, 2018. p. 407 https://www.whitehouse.gov/wp-content/uploads/2018/02/ERP_2018_Final-FINAL.pdf

[93] Congressional Budget Office. "Public Spending on Transportation and Water Infrastructure 1956 to 2014. March, 2015. https://www.cbo.gov/sites/default/files/114th-congress-2015-2016/reports/49910-infrastructure.pdf

[94] McNichol, Elizabeth and Waxman, Samantha. "States Faced Revenue Shortfalls in 2017 Despite Growing Economy." Center on Budget and Policy Priorities. October 4, 2017. https://www.cbpp.org/research/state-budget-and-tax/states-faced-revenue-shortfalls-in-2017-despite-growing-economy

[95] Pew Charitable Trusts. "The State Pension Funding Gap: 2015." April 20, 2017. http://www.pewtrusts.org/en/research-and-analysis/issue-briefs/2017/04/the-state-pension-funding-gap-2015

[96] Pew Charitable Trusts. "The State Pension Funding Gap: 2015." April 20, 2017. http://www.pewtrusts.org/en/research-and-analysis/issue-briefs/2017/04/the-state-pension-funding-gap-2015

[97] Klein, Aaron. "How the new tax bill will cut infrastructure investment." Brookings Institution. December 26, 2017. https://www.brookings.edu/blog/up-front/2017/12/26/how-the-new-tax-bill-will-cut-infrastructure-investment/

[98] Muro, Mark and Whiton, Jacob. "Geographic gaps are widening while U.S. economic growth increases." Brookings Institution. January 23, 2018. https://www.brookings.edu/blog/the-avenue/2018/01/22/uneven-growth/

[99] Blair, Hunter. "What is the ideal mix of federal, state, and local government investment in infrastructure?" Economic Policy Institute. September 11, 2017. http://www.epi.org/publication/what-is-the-ideal-mix-of-federal-state-and-local-government-investment-in-infrastructure/

[100] Blair, Hunter. "What is the ideal mix of federal, state, and local government investment in infrastructure?" Economic Policy Institute. September 11, 2017. http://www.epi.org/publication/what-is-the-ideal-mix-of-federal-state-and-local-government-investment-in-infrastructure/

[101] Andraz, Jorge M. and Pereira, Alfredo M. "Public highway spending and state spillovers in the USA." August 16, 2016. http://www.tandfonline.com/doi/abs/10.1080/1350485042000254593

[102] Congressional Budget Office. "Public Spending on Transportation and Water Infrastructure 1956 to 2014. March, 2015. https://www.cbo.gov/sites/default/files/114th-congress-2015-2016/reports/49910-infrastructure.pdf

[103] Congressional Budget Office. "Public Spending on Transportation and Water Infrastructure 1956 to 2014. March, 2015. https://www.cbo.gov/sites/default/files/114th-congress-2015-2016/reports/49910-infrastructure.pdf

[104] JEC Democratic Staff analysis based upon Congressional Budget Office and Bureau of Economic Analysis data.

[105] Congressional Budget Office. "Public Spending on Transportation and Water Infrastructure 1956 to 2014. March, 2015. https://www.cbo.gov/sites/default/files/114th-congress-2015-2016/reports/49910-infrastructure.pdf

[106] Dawsey, Josh. "Mixed signals on infrastructure plan emerge from Trump retreat." Washington Post. January 7, 2017. https://www.washingtonpost.com/politics/mixed-signals-on-infrastructure-plan-emerge-from-trump-retreat/2018/01/07/56aa5a8c-f3db-11e7-91af-31ac729add94_story.html?utm_term=.6821d7d85537

[107] Shirley, Chad. Deputy Assistant Director for Microeconomic Studies at Congressional Budget Office. Testimony before Committee on Ways and Means. June 17, 2015. https://www.cbo.gov/sites/default/files/114th-congress-2015-2016/reports/50298-TransportationTestimony_1.pdf

[108] Engel, Eduardo; Fischer, Ronald; Galetovic, Alexander. "Public-Private Partnerships to Revamp U.S. Infrastructure." The Hamilton Project. February, 2011. http://www.hamiltonproject.org/assets/legacy/files/downloads_and_links/Final_ENGELDiscussPap_Feb2011.pdf

[109] Shirley, Chad. Deputy Assistant Director for Microeconomic Studies at Congressional Budget Office. Testimony before Committee on Ways and Means. June 17, 2015. https://www.cbo.gov/sites/default/files/114th-congress-2015-2016/reports/50298-TransportationTestimony_1.pdf

[110] Democratic staff of the Joint Economic Committee. "Risks of Relying on Private Sector to Address America's Infrastructure Needs." March 21, 2017. https://www.jec.senate.gov/public/_cache/files/fdd44e41-6071-4e67-b551-034f1966d74f/risks-of-relying-on-private-sector-to-meet-nation-s-infrastructure-needs.pdf

[111] Istrate, Emilia and Puentes, Robert. "Moving Forward on Public Private Partnerships:

U.S. and International Experience with PPP Units." Brookings-Rockefeller Project on State and Metropolitan Innovation. December, 2011.

https://www.brookings.edu/wp-content/uploads/2016/06/1208_transportation_istrate_puentes.pdf
[112] 2018 Economic Report of the President. February 2018. P. 194 https://www.whitehouse.gov/wp-content/uploads/2018/02/ERP_2018_Final-FINAL.pdf
[113] Kahn, Matthew E and Levinson, David M. "Fix It First, Expand It Second, Reward It Third: A New Strategy for America's Highways." Hamilton Project. February, 2011. https://www.brookings.edu/wp-content/uploads/2016/07/02_highway_infrastructure_kahn_levinson_paper.pdf
[114] Cassady, Alison; DeGood, Kevin; Preiss, Allison; Frederick, Rejane. "6 Things to Watch for in Trump's Infrastructure Scam." Center for American Progress. February 9, 2018. https://www.americanprogress.org/issues/economy/news/2018/02/09/446250/6-things-watch-trumps-infrastructure-scam/
[115] DeGood, Kevin. "The Hazards of Noncompete Clauses in Public-Private Partnership Deals." Center for American Progress. July 27, 2016. https://www.americanprogress.org/issues/economy/reports/2016/07/27/141873/the-hazards-of-noncompete-clauses-in-public-private-partnership-deals/
[116] Wirtz, Ronald A. "Public-Private Partnerships: For Whom the Road Tolls?" Federal Reserve Bank of Minneapolis. June, 2009. https://www.minneapolisfed.org/publications/the-region/publicprivate-partnerships-for-whom-the-road-tolls
[117] Wirtz, Ronald A. "Public-Private Partnerships: For Whom the Road Tolls?" Federal Reserve Bank of Minneapolis. June, 2009. https://www.minneapolisfed.org/publications/the-region/publicprivate-partnerships-for-whom-the-road-tolls
[118] Congressional Budget Office. "Using Public-Private Partnerships to Carry Out Highway Projects." January, 2012. https://www.cbo.gov/sites/default/files/112th-congress-2011-2012/reports/01-09-PublicPrivatePartnerships.pdf and Joint Economic Committee Democrats. "Republicans Plan Bait and Switch on Infrastructure." January 30, 2018. https://www.jec.senate.gov/public/_cache/files/0dde87b4-3887-468b-9066-ac7b6a6d8dea/republicans-plan-bait-and-switch-on-infrastructure-final.pdf

[119] DPCC. "Six Facts You Need to Know about the Trump Toll Plan." February 12, 2018.

https://www.democrats.senate.gov/imo/media/doc/Six%20Things%20You%20Need%20to%20Know%20About%20the%20Trump%20Toll%20Plan.pdf
[120] U.S. Department of Labor. "Overtime Final Rule: Summary of the Economic Impact Study."
https://www.dol.gov/whd/overtime/final2016/overtimeFinalRule.pdf
[121] Paquette, Danielle. "The Trump administration wants restaurant workers to share tips. Opponents fear their bosses will snatch them." Washington Post. December 4, 2017.
https://www.washingtonpost.com/news/wonk/wp/2017/12/04/the-trump-administration-wants-workers-to-share-tips-opponents-fear-their-bosses-will-snatch-them/?utm_term=.e8ed95886495; and U.S. Department of Labor. "U.S Department of Labor Proposal Gives Freedom to Share Tips Between Traditionally Tipped and Non-Tipped Workers." December 4, 2017.
https://www.dol.gov/newsroom/releases/whd/whd20171204
[122] Bloomberg Law. "Labor Dept. Ditches Data Showing Bosses Could Skim Waiters' Tips." February 1, 2018. https://bnanews.bna.com/daily-labor-report/labor-dept-ditches-data-on-worker-tips-retained-by-businesses
[123] Rowell, Alex and Walter, Karla. "President Trump's Policies are Hurting American Workers." Center for American Progress. January 26, 2018.
https://www.americanprogressaction.org/issues/economy/reports/2017/08/15/168366/president-trumps-policies-hurting-american-workers/ ; and Federal Register. "A Proposed Rule by the Mine Safety and Health Administration on 09/12/2017." https://www.federalregister.gov/documents/2017/09/12/2017-19381/examinations-of-working-places-in-metal-and-nonmetal-mines
[124] Rowell, Alex and Walter, Karla. "President Trump's Policies are Hurting American Workers." Center for American Progress. January 26, 2018.
https://www.americanprogressaction.org/issues/economy/reports/2017/08/15/168366/president-trumps-policies-hurting-american-workers/
[125] Michaels, Dave. "SEC Signals Pullback From Prosecutorial Approach to Enforcement." Wall Street Journal. October 26, 2017.
https://www.wsj.com/articles/sec-signals-pullback-from-prosecutorial-approach-to-enforcement-1509055200
[126] White, Gillian B. "Mick Mulvaney is Quickly Deregulating the Financial Industry." The Atlantic. January 5, 2018.
https://www.theatlantic.com/business/archive/2018/01/cfpb-gop-trump/549755/
[127] Steinbaum, Marshall. "A New Study of Labor Market Concentration." The Roosevelt Institute. http://rooseveltinstitute.org/new-study-labor-market-concentration/
[128] Wessel, David. "Is Lack of Competition Strangling the U.S. Economy?" Harvard Business Review. March-April 2018 issue. https://hbr.org/2018/03/is-lack-of-competition-strangling-the-u-s-economy
[129] See both Wessel, David. "Is Lack of Competition Strangling the U.S. Economy?" Harvard Business Review. March-April 2018 issue.

https://hbr.org/2018/03/is-lack-of-competition-strangling-the-u-s-economy
and Kahn, Lina and Vaheesan, Sandeep. "Market Power and Inequality: the
Antitrust Counterrevolution and its Discontents." 11 Harvard Law & Policy
Review 235 (2017).
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2769132 for summaries.

EXHIBIT 188

BROOKINGS

COMMENTARY

The economic impact of the opioid epidemic

Julia Paris, Caitlin Rowley, and Richard G. Frank

April 17, 2023

> **Editor's note:** *This blog post is part of the USC-Brookings Schaeffer Initiative for Health Policy ↗, which is a partnership between Economic Studies at Brookings and the University of Southern California Schaeffer Center for Health Policy & Economics. The Initiative aims to inform the national health care debate with rigorous, evidence-based analysis leading to practical recommendations using the collaborative strengths of USC and Brookings. We gratefully acknowledge support from the Robert Wood Johnson Foundation and the National Institute on Drug Abuse.*

There is strong evidence that the opioid epidemic has reduced labor force participation in the United States. While use of prescription opioids aimed at pain management for some individuals may enhance their ability to work, the widespread misuse of opioids has resulted in an epidemic of opioid use disorders (OUD), labor supply disruptions, and unprecedented deaths. Opioid misuse can compromise labor supply in a variety of ways, including absenteeism, increased workplace accidents, and withdrawal from the labor force due to disability, incarceration, or death.

Overview of the issue

The opioid epidemic has been widely characterized as having three distinct waves of overdose deaths ↗: the first wave beginning in the 1990s with increases in deaths involving prescription opioids; the second wave beginning in 2010 with increases in

deaths involving heroin; and the third wave beginning in 2013 with increases in deaths involving synthetic opioids such as fentanyl. Several researchers have investigated the effects of elevated prescription opioid misuse, which began during the first wave of the epidemic, on labor supply. Though one study ↗ found small positive effects of prescription opioids on labor force participation for women, the majority ↗ of ↗ studies (https://www.brookings.edu/wp-content/uploads/2018/02/kruegertextfa17bpea.pdf) on this relationship have found that regions with higher exposure to opioid prescriptions experienced significant declines in labor force participation. In a 2016 survey (https://www.brookings.edu/wp-content/uploads/2017/09/1_krueger.pdf) of men aged 25-54 who were not in the labor force, nearly half of respondents reported taking pain medications on a daily basis, two-thirds of whom were taking prescription pain medications. In a follow-up survey ↗ of women in the same age group who were not in the labor force, 54% of respondents reported taking pain medications daily, half of whom were taking prescription medications.

The rise in illicit opioid use during the second and third waves of the opioid epidemic also reduced labor force participation, decreased employment ↗, and increased applications ↗ for Social Security Disability Insurance (SSDI) and Supplemental Security Income (SSI). Incarceration for offenses related to illicit opioids likely also contributes to the decrease in labor force participation caused by the opioid epidemic.

Altogether, the effects of the opioid epidemic on labor force participation have been significant. One estimate (https://www.brookings.edu/blog/brookings-now/2017/09/07/how-the-opioid-epidemic-has-affected-the-u-s-labor-force-county-by-county/) suggests the opioid epidemic accounts for 43% of the decline in men's labor force participation rate between 1999 and 2015, and 25% of the decline for women.

Beyond its effects on labor force participation, the opioid epidemic also has implications for the working population. An estimated 12.6% of the U.S. workforce ↗ receives an opioid prescription each year, and 75% of employers surveyed by the National Safety Council ↗ report that they have been directly affected by opioids. OUD can impact workers' labor market outcomes: workers with substance use disorders ↗ take nearly 50% more days of unscheduled leave than other workers, have an average turnover rate 44% higher than that for the workforce as a whole, and are more likely to experience occupational injuries ↗ that result in time away from work.

While the opioid epidemic has had significant impacts across the labor market, its effects have been particularly pronounced in specific occupations and industries. A CDC analysis ↗ of mortality data from 21 states concluded that unintentional and undetermined overdose deaths accounted for a disproportionate share of all deaths in the following six occupational groups: construction, extraction (e.g., mining), food preparation and serving, health care practitioners, health care support, and personal care and service. These fatalities are particularly concentrated in construction and extraction: an analysis by the Massachusetts Department of Public Health ↗ found that individuals employed in construction and extraction accounted for over 24% of all overdose deaths in the state's working population.

Notably, the jobs with the highest rates of opioid overdose fatalities generally have high occupational injury rates and low access to paid sick leave ↗. Figure 1 demonstrates that the industries with the highest rates of overdose fatalities in the workplace have elevated occupational injury rates for fractures and musculoskeletal disorders, both of which are ↗ significant ↗ risk ↗ factors ↗ for long-term opioid use.

Figure 1. Occupational Injury Rates by Industry-Level Workplace Overdose Fatality Rate

Source: Authors' analysis of industry-level 2021 Census of Fatal Occupational Injuries (CFOI) and 2019 Survey of Occupational Injuries and Illnesses (SOII) data. Analysis is restricted to private industries.
Note: Industry-level overdose fatality rates are based on unintentional drug overdose deaths recorded in the 2021 CFOI. Note that the CFOI only includes overdose deaths that occur in the workplace. Industries are sorted into categories for Low, Average, and High Overdose Fatalities by tercile of overdose fatality rate.

USC Schaeffer   BROOKINGS

Occupational injuries often lead to opioid prescriptions. For example, a study of workers' compensation claims ↗ from 2013-2015 in Tennessee found that, among previously opioid-free workers who were injured on the job, one-third had received an opioid prescription within six months of their occupational injury. Another national study ↗ of construction workers found that individuals with occupational injuries were nearly four times more likely to use prescription opioids than those without injuries. As such, work-related injury is a significant risk factor for OUD and its sequelae: one study of all opioid-related fatalities in Utah ↗ during 2008-2009 found that 57% of all decedents had experienced at least one prior occupational injury.

Employees with limited access to paid sick leave may also rely on opioids after an occupational injury ↗ in order to manage pain and continue working, making them more vulnerable to OUD. In the analysis completed by the Massachusetts Department of Public Health ↗, the rate of opioid-related deaths was roughly four times higher in industries with low access to paid sick leave. In addition, the share of employees with access to paid sick leave is nearly 20% lower in industries with high workplace overdose fatality rates, compared to industries with low workplace overdose fatality rates (Figure 2). These links between occupational injury, employee benefits, and OUD suggest an important role for employers in primary prevention of OUD.

Figure 2. Access to Paid Sick Leave by Industry-Level Workplace Overdose Fatality Rate

Source: Authors' analysis of industry-level 2021 Census of Fatal Occupational Injuries (CFOI) and 2022 National Compensation Survey (NCS) data. Analysis is restricted to private industries. Note: Industry-level overdose fatality rates are based on unintentional drug overdose deaths recorded in the 2021 CFOI. Note that the CFOI only includes overdose deaths that occur in the workplace. Industries are sorted into categories for Low, Average, and High Overdose Fatalities by tercile of overdose fatality rate. NCS data are not available for the agricultural sector, so the 'Agriculture, forestry, fishing, and hunting' industry is excluded from the analysis of sick leave. As a result, the reported access to paid sick leave for the Average Overdose Fatalities category may be an over-estimate.

USC Schaeffer   BROOKINGS

Employers have also been impacted by the opioid epidemic and its effects on the U.S. workforce. First, the decrease in labor force participation has reduced the pool of workers from which employers can hire, which is a particular concern given the tightness of the U.S. labor market ↗ in recent years. In addition, employees with OUD impose higher costs to their employers, particularly through health insurance and workers' compensation. Approximately a third ↗ of working-age adults with OUD are covered by private insurance, which pays an estimated half of all opioid prescription costs ↗ for U.S. workers. While employer spending on opioid prescriptions peaked in 2009, overall OUD treatment costs have continued to increase: large employer plans spent $2.6 billion on OUD-related costs in 2016 ↗, over four times more than they spent in 2009. Employees with OUD may also incur higher ↗ workers' compensation costs ↗ for employers. These direct costs, in addition to indirect costs incurred to employers through absenteeism, turnover, and lost productivity, are estimated ↗ to total in the thousands for each employee with OUD.

A recent study ↗ suggests that these opioid-related pressures on employers have had measurable impacts on firm behavior and performance. The authors compare firms in counties with higher growth in opioid use to those in counties with low growth in opioid use, controlling for their baseline characteristics. They find that, after the five-year study period, establishments in high-opioid growth counties employ fewer people and spend comparatively more on information technology. This suggests that firms might be substituting technology for employees when they are faced with labor shortages and higher per-employee costs induced by the opioid epidemic. This study also provides evidence that the opioid epidemic may negatively impact firm valuation: when state laws are introduced to reduce access to opioids, which might mitigate the negative impacts of the opioid epidemic, the authors observe an increase in employer firms' stock prices in the relevant states.

Addressing the problem

The opioid epidemic can impact employers, but employers can also have an impact on the opioid epidemic. The evidence cited above highlights a potential business case to be made for employers both preventing OUD among their workers and supporting workers that are in active recovery from OUD. Additionally, the benefits of employment for individuals in recovery should not be understated. Work is a good predictor of positive outcomes ↗ for individuals with substance use disorder (SUD). Compared with

individuals who are unemployed and in recovery from SUD, those who are employed ↗ are more likely to exhibit lower rates of recurrence, higher rates of abstinence, fewer parole violations, and improvements in quality of life. Moreover, there is evidence that employer-mandated treatment is as, if not more, successful ↗ than treatment mandated by friends or family.

However, despite the mutual benefit that work provides to employees and employers, many barriers to employment ↗ for people with OUD persist, including poor work history, lack of job skills, lower educational attainment, and scheduling conflicts with treatment programs.

Some individuals with OUD have a prior criminal history, and are thus impacted by the collateral consequences of conviction ↗, which can include ineligibility for employment in health care facilities or within a state government or ineligibility to obtain a professional license in certain fields.

Employers may add to these existing barriers when they implement punitive and stigmatizing ↗ drug testing ↗. These programs can not only lead to the firing of current employees but can deter people from applying to jobs in the first place. The consequences of this practice impact both employers and employees. For employers, firing an existing worker means having to hire and train a replacement or spending longer on a hiring process and possibly missing out on a strong candidate. For employees, this can often mean missing out on benefits of steady work, including the income and social supports that come with it.

Policies and programs to support recovery

Supporting individuals in recovery requires a "whole-of-society" approach. The private sector, public sector, health care sector, community organizations, and families all have a role to play. There are a number of policies and programs in place to support employment for individuals in recovery, though more can be done to support awareness, implementation, and evaluation.

Opioid use disorder prevention

Employers can play an important role in the upstream prevention of SUD among their employees. A number of tools ↗ and resources ↗ exist to support employers with substance misuse prevention—especially in industries with high rates of occupational injuries. Historically, opioids have been overprescribed ↗ in the workers' compensation system. In recent years, many ↗ states ↗ have ↗ taken ↗ measures ↗ to both reduce ↗ the number of compensation claims with prescription opioids and decrease ↗ the average amount of opioids prescribed per workers' compensation claim. However, opioid dispensing rates within workers' compensation systems continue to vary ↗ by industry, company size, age of the injured worker, type of injury, and county-level factors. Employers can work closely with health insurers, workers' compensation carriers, and pharmacy benefit managers ↗ to access utilization data and promote conservative prescribing guidelines for injured workers. By taking a proactive role, employers have the potential prevent OUD and overdose among their employees.

Recovery-friendly workplaces

As defined by the Department of Labor ↗ (DOL), "recovery-friendly workplaces are characterized by the adoption of policies and practices that:

- Expand employment opportunities for people in or seeking recovery;

- Inform employees in recovery that they may have the right to reasonable accommodations and other protections that can help them keep their jobs;

- Reduce the risk of substance use and substance use disorder, including through education and steps to prevent injury in the workplace;

- Facilitate help-seeking among employees with substance use disorder; and,

- Ensure access to needed services, including treatment, recovery support, and mutual aid."

The Recovery-Ready Workforce Resource Hub ↗ includes federal resources, state resources, local resources, union and trade association resources, community-based recovery support resources for employers, and training for employers to implement policies in their own places of work.

Employment assistance programs ↗ (EAPs) can also be used to promote a recovery-friendly workplace. An EAP is designed to assist employees in resolving personal problems that may be negatively impacting their performance, including struggles with SUDs. However, while nearly 98% of mid-to-large companies offer EAPs ↗, only 4% of employees use them each year. Low utilization is likely due to lack of awareness of programs offered, and stigma and confidentiality-related concerns about SUD. It is also unclear how widespread EAP availability is within industries with high rates of OUD like construction and mining—further data collection is needed to target strategies for uptake among these employees and industries.

The federal government incentivizes the hiring of individuals in recovery through the Department of Labor's Federal Bonding Program ↗, which provides fidelity bonds for "at-risk" and difficult-to-place job seekers. These bonds ↗ cover the first six months of employment at no cost to the job seeker or the employer. The DOL and the Office of National Drug Control Policy ↗ have also devoted resources to the promotion of Individual Placement and Support ↗ for individuals with OUD. Though this model has been traditionally used for job seekers with serious mental illness and developmental disabilities, there is emerging ↗ evidence ↗ of its effectiveness as an approach for people with SUD, although more research of this model is necessary. State governments in New York ↗ and Illinois ↗ have also created tax credits to incentivize employers to hire individuals in recovery. Within the business community, the U.S. Chamber of Commerce has promoted resources ↗ for second chance hiring programs.

Despite the availability of resources and incentives, the National Safety Council recently reported ↗ that 75% of surveyed employers have been impacted by prescription drug misuse, but fewer than 17% feel extremely prepared to deal with it. This demonstrates the importance of continued education and outreach to the business community to ensure they are supported in the endeavor of building recovery-friendly workplaces.

Conclusion

The effects of the opioid epidemic in the United States have been far-reaching, causing unprecedented deaths and long-term health impacts including OUD. This health crisis has also had implications for the U.S. economy, including disruptions to

the labor force. Recent evidence demonstrates that employers have been adversely impacted by the opioid epidemic through workforce shortages, reduced employee productivity, and elevated personnel costs. In addition, workplace factors appear to impact the incidence of OUD among employees. As such, employers are well-positioned to help address the epidemic through efforts to reduce the use of opioids for pain management among their employees and support recovery among workers.

This piece was supported by the Robert Wood Johnson Foundation and the National Institute on Drug Abuse.

AUTHORS

Julia Paris Former Senior Research Assistant - Economic Studies, Center on Health Policy

Caitlin Rowley Center Coordinator - Economic Studies, Center on Health Policy

Richard G. Frank Director - Center on Health Policy, Senior Fellow - Economic Studies

EXHIBIT 189

A Substance Use Cost Calculator for US Employers With an Emphasis on Prescription Pain Medication Misuse

Eric Goplerud, PhD, Sarah Hodge, MPH, and Tess Benham, BS

Abstract

Objective:

Substance use disorders are among the most common and costly health conditions affecting Americans. Despite estimates of national costs exceeding $400 billion annually, individual companies may not see how substance use impacts their bottom lines through lost productivity and absenteeism, turnover, health care expenses, disability, and workers' compensation.

Methods:

Data on employed adults (18 years and older) from 3 years (2012 to 2014) of the National Survey on Drug Use and Health Public Use Data Files were analyzed.

Results:

The results offer employers an authoritative, free, epidemiologically grounded, and easy-to-use tool that gives specific information about how alcohol, prescription pain medication misuse, and illicit drug use is likely impacting workplaces like theirs.

Conclusion:

Feedback

Employers have detailed reports of the cost of substance use that can be used to improve workplace policies and health benefits.

Risky use of alcohol, prescription pain medication misuse, and other drug use disorders are among the most common and costly health conditions affecting Americans [Substance use disorder (SUD) is a condition in which the use of one or more substances leads to a clinically significant impairment or distress. SUDs can include any psychoactive drug, for example, alcohol, prescription pain medications, heroin, cocaine, and marijuana.] The Surgeon General reports that in 2015, 66.7 million people in the United States reported drinking more than five drinks on one occasion at least once in the past month and 27.1 million adolescents and adults used illicit drugs or misused prescription drugs.[1] The costs to the individuals and families are grave. Alcohol contributes to 88,000 deaths each year in the US; one in 10 deaths among working adults are alcohol-related.[2] Added to that, in 2014, there were 47,055 drug overdose deaths: 28,647 of whom died from overdoses from prescription pain relievers or heroin.[3]

The cost of substance use to employers may not be as apparent. Despite estimates that the national bill for substance use annually is more than $400 billion,[4,5] individual companies may not see how substance use impacts their bottom lines through lost productivity and absenteeism, turnover, health care expenses, disability, and workers' compensation, and increased taxes to pay for law enforcement, criminal justice, and publicly supported medical treatment. Business leaders remain largely in the dark about how substance use impacts their companies and what they can do to reduce their risks and costs.[6–8]

The Real Costs of Substance Use in Your Workforce (https://www.nsc.org/forms/substance-use-employer-calculator/index.aspx) was designed to be an authoritative, epidemiologically grounded, and easy-to-use tool that provides employers with specific information about how alcohol, prescription pain medication misuse, and illicit drug use impacts their workplaces. It also provides research-proven steps employers can take to help employees and family members of their employees who have substance use problems and, at the same time, increase the safety, health, and productivity of their workforces. The new tool updates an earlier SUD Calculator introduced by this research team in 2003, and most recently refreshed in 2009 (www.alcoholcostcalculator.org, www.alcoholcostcalculator.org/sub). This paper describes the methods used and important results derived from the new tool.

METHODS

Sources of Data

Three years of data from the annual Federal substance use epidemiological survey, the National Survey on Drug Use and Health (NSDUH) 2012 to 2014 are the primary sources for the Calculator [Public use data (PUD) files of the NSDUH were analyzed online at http://pdas.samhsa.gov/#/?_k=m9xwxh.] The Substance Abuse and Mental Health Services Administration (SAMHSA) conducts the NSDUH. Each year, a nationally representative sample of approximately 67,500 persons ages 12 years and above is interviewed. PUD files are made available about 18 months after the

annual survey results are released. The PUD files contain weighted, anonymized data from approximately 55,000 adolescents and adults. Questions include lifetime, annual, and past-month usage of alcohol, marijuana, cocaine, hallucinogens, heroin, inhalants, tobacco, pain relievers, tranquilizers, stimulants, and sedatives. The NSDUH survey also covers mental health and physical health symptoms, mental health and substance use treatment history, health care utilization, and health insurance coverage. Demographic data include gender, race, age, ethnicity, educational level, job status, workplace characteristics, and income. The research team separately analyzed the 2012 to 2014 NSDUH PUD and averaged the results. All respondents employed full- or part-time were included in analyses (25,201 in 2012; 25,235 in 2013; 27,030 in 2014). Respondents who did not report paid employment in the prior year were excluded from the analyses. The NSDUH survey is constructed so that *Diagnostic and Statistical Manual of Mental Disorders IV* diagnoses of SUDs can be derived.[9] Nationally, 0.7% of working adults have a pain medication use disorder, 1.7% used a pain reliever nonmedically within the previous 30 days, 7.9% had an alcohol use disorder, 2.5% an illicit drug use disorder, and 1.7% a marijuana use disorder. Overall, 8.6% of adults had a SUD.

The Survey Documentation and Analysis (SDA, version 3.5) was the primary online software to analyze the NSDUH [SDA, an online analysis system was developed and is maintained by the Computer-assisted Survey Methods Program (CSM) at the University of California, Berkeley. SDA results are comparable to SAS, Stata, and SUDAAN. For more information on SDA 3.5: http://sda.berkeley.edu/document.htm.] The data and SDA are part of the Substance Abuse and Mental Health Data Archive maintained by the Inter-University Consortium for Political and Social Research at the University of Michigan and the SAMHDA Public-use Data Analysis System (PDAS; http://datafiles.samhsa.gov/info/analyze-public-data-nid6).

Adjusting Prevalence Estimates: States

There are substantial differences between states in the prevalence of prescription pain medication misuse and SUDs generally. SAMHSA pools several years' NSDUH data to provide state estimates of substance use (SAMHSA does not report state-specific rates of opioid disorder but does provide state rates of prescription pain medication misuse in previous 30 days.)[10,11] In order to account for these differences, the average prevalence of prescription pain medication misuse and SUDs for persons 18 years and older in each state 2012 to 2014 was divided into the national prevalence rate for this age group.

Among employed adults, the prevalence of any SUD, including alcohol use disorder, is 8.6% nationally, ranging from Utah and Tennessee at 7.4% of 18 year olds and above, to Washington, DC (13.4%), Rhode Island (10.8%), and Montana (10.0%). The national prevalence of prescription pain medication misuse in the past 12 months is 4.2%. At the higher end are Arizona (5.2%), Oklahoma (5.1%), Alabama (5.0%), and Oregon (5.0%). At the lower end are Wyoming (3.4%), Florida (3.4%), Maine (3.4%), and Vermont (3.34%).

Adjusting Prevalence Estimates: Industry Sector

Most people with SUDs work (Fig. 1). In the age group between 18 and 64 years, 75% of adults with a SUD are in the workforce. Similarly, 78% of adults with an alcohol use disorder are in the workforce. A smaller proportion of adults who report past month misuse of pain medications are in the workforce (68%), and still fewer who have a pain medication use disorder (60%). Adults with SUDs are about twice as likely to be unemployed (9% vs 5%). Two-thirds (67%) of workers with a SUD are male, a ratio that holds for alcohol, illicit drug, and pain medication use disorders. Workers with a SUD are more likely than their peers to be younger, have a lower family income, and less likely to be married (Table 1).

FIGURE 1

Workforce participation.

TABLE 1

Demographics of Workers

	Overall US Workforce	Pain Med Use Disorder	Any Substance Use Disorder
Male	53%	61%	67%
Married	54%	28%	33%
Between 18 and 34 years	34%	66%	55%
Family income below $20K	12%	24%	18%

The NSDUH elicits information about employment status, industry sector, and occupation. Respondents are assigned to one of 14 industry sector based on their current job, and to one of 14 occupational categories. The proportion of NSDUH respondents who report working in specific industries mirrors rates reported by the Bureau of Labor Statistics (The only exceptions are in the categories education and health, which in 2014 composed 14% of the workforce and government,

which composed 14%. The comparable NSDUH categories were 12% for education and health, and 5% for public administration. Discrepancies are likely a result of the NSDUH assigning some government worksites to education and health.)[12]Table 2 compares the proportion of the US workforce employed in 14 industry sectors per the Bureau of Labor Statistics and the corresponding percentage of NSDUH respondents in those industries in the 3 years sampled. The third column shows the total number of NSDUH respondents working in each industry in the 3 years sampled.

TABLE 2

Industry Representation in the NDSUH

	BLS 2014 (%)	NSDUH (%)	Number in NSDUH
Agriculture, forestry, fishing, and hunting	1.4	1.4	1,254
Mining	0.6	0.6	605
Construction	4.1	7.5	15,357
Manufacturing	8.1	10.5	7,380
Utilities and transportation	3.5	5.0	3,032
Information	1.8	2.3	1,386
Wholesale trade	3.9	2.5	1,697
Retail trade	10.2	10.5	10,452
Financial activities	5.3	6.5	4,022
Professional and business services	12.7	11.9	8,214
Educational services, health	14.3	22.3	17,294
Leisure and hospitality	9.8	9.3	11,125
Government, public administration	14	4.6	3,118
Other services	4.2	5.6	4,193

Work Days Missed

The NSDUH asks respondents two questions about unscheduled leave in the previous 30 days. They are asked about whole days of work missed due to illness and injury. Respondents are also asked how many whole days they missed because they just did not want to be there (not including days missed because of a planned vacation or days missed for illness, injury or care for a sick child or other family member). Responses to these two questions are summed and annualized to measure the total number of missed workdays per year. Many employers provide sick leave or paid time off (PTO) that covers all forms of work absence (vacation, illness, etc). The unscheduled work days missed reported in this study may be covered by employers' sick leave or PTO benefits. But these absences can be inconveniences and costs for employers who must still get the work

done. They may need to hire substitutes or add to other workers' duties. One study found that one in five workers reports being injured or put in danger on the job because of a coworker's drinking, or having to work harder, redo work, or cover for a coworker as a result of a fellow employee's drinking.[13]

Health Care Use

Respondents are asked about health care use in the prior 12 months: how many times they had gone to a hospital emergency room, whether they had been hospitalized overnight, and, if so, for how many nights, and the number of outpatient primary care visits. Respondents were also asked about past 12-month and lifetime substance use treatment.

Cost of Health Care

The Surgeon General's 2016 report "Facing Addiction in America" notes that the US spends roughly $35 billion per year to treat SUDs, and another $85 billion to treat the injuries, infections, and illnesses associated with risky and dependent substance use.[14,15] If the payment of the combined $120 billion cost was spread evenly across the total US population in 2016, the result would be an annual cost of $370 for each person in the US.

However, those big numbers are difficult for employers to apply to their workforces. To more precisely estimate health care costs for individual employers who are associated with untreated SUDs in their workforce, we calculated from NSDUH the average hospital, emergency department, and ambulatory primary care use by workers with or with no current SUDs. Use by workers' family members with a SUD was estimated from the overall prevalence of SUDs among NHSDUH respondents aged 12 to 65 years, and the health care use of those with and with no SUD in that age group. Utilization was then multiplied by the most recently available Federal government and health care industry data on average paid claims for hospital nights, ED, and ambulatory care visits. From the Healthcare Cost and Utilization Project (HCUP), average hospital paid claim per day in 2014 was $2553.[16] The average emergency department visit cost $1863 in 2013 and ambulatory visit was $103 (Average expense in 2009 was $218.)[17,18]

Employers that offer health insurance to their employees cover, on average, 79% of individual workers' premiums and 73% of family premiums (http://kff.org/state-category/health-costs-budgets/employer-based-health-insurance-premiums/). Employers' costs were discounted by the percentage of employer's premium support for individual workers and for dependents.

Cost of Missed Work Days

For each industry sector, the average number of unscheduled work days missed by a worker with a SUD was compared with the average number of days missed by all workers in that sector. The direct costs of unscheduled leave was computed by multiplying those averages by the fully loaded

daily wage data for each sector published by the US Bureau of Labor Statistics (The agricultural wage was derived from Fayer).[19]–[21] The actual cost of unscheduled leave may significantly underestimate the true costs to employers who must cover missed work with substitute personnel.

Cost of Turnover, Replacement, and Other Problems

Substance use is associated with a number of hazardous and costly social consequences that can have negative impacts in the workplace that can be derived from NSDUH responses. Studies place the average cost to employers of recruiting and training replacement workers at 21% of an employee's annual fully loaded salary.[22,23] Replacement and retraining costs are greater for workers with more education and training, and lower for workers paid less and with fewer skills. For the Calculator, employers' turnover costs are computed from the difference in rates of 1-year turnover in each industry sector of workers with and without a SUD and the estimated costs of replacement in that sector (Replacement costs for each sector were figured at 21% of the average annual salary and fringe for that sector.)[19]

Substance use is associated with other problems that can impact employees' productivity and safety that have not been monetized. These include inattention while at work (referred to as "presenteeism"), accidents and injuries associated with driving while intoxicated, and workplace and domestic violence.[24,25]

PRIOR SUBSTANCE USE TREATMENT AND RECOVERY

NSDUH asks detailed questions about prior substance use treatment. Self-reported prior treatment for an SUD among workers is uncommon: only 1.3% report receiving prior treatment. For the present study, we define workers in recovery as individual with no current or previous 12-month diagnosis of any alcohol or drug use disorder who report having received substance use treatment at some point in their lives.

RESULTS

Prevalence of Prescription Pain Medication, Alcohol, and SUDs by Industry Sector

Industries with younger, male-dominated workforces, and those that have easy access to alcohol have high rates of substance use and alcohol use disorders. Construction, entertainment, recreation, and food service businesses have nearly twice the rates of substance use and alcohol use disorders as the national average (15% compared with 8.6% nationally for SUDs, 12% compared with 7.5% nationally for alcohol use disorders). Pain medication misuse and pain medication use disorders follow a similar pattern, with two to three times higher rates of pain medication problems in these industries than the nation's workforce in general. By contrast, older and more female workforces in public administration, education, and health and social services experience about two-thirds the national rates of substance use (Table 3).

TABLE 3

Rates of Substance Use Disorders by Industry

	Any SUD	Alcohol Use Disorder	Illicit Drug Use Disorder	Pain Med and Opioid Use Disorder	Marijuana Use Disorder
Entertainment, recreation, food	15.3	12.1	5.7	1.6	3.5
Construction	15.0	12.4	4.4	1.3	2.3
Wholesale, nondurable	10.6	9.4	2.4	0.7	1.2
Professional, mgmt., admin	10.3	8.6	2.7	0.9	1.6
Mining	10.3	9.6	1.0	1.0	0.1
Retail	9.8	7.9	3.3	0.9	2.1
Information, communications	9.7	8.2	2.3	0.6	1.4
Finance, insurance real estate	9.1	8.1	1.5	0.3	1.0
Wholesale, durable	8.7	8.1	1.3	0.4	0.9
Other services except publ. admin	8.7	7.1	2.5	1.0	1.6
Agriculture	8.6	7.5	1.7	0.4	1.2
Manufacturing, durable	8.4	7.5	1.5	0.8	0.6
Manufacturing, nondurable	8.0	6.7	2.1	0.6	1.1
Transportation, utilities	7.5	6.6	1.7	0.6	0.9
Education, health, social services	6.4	5.4	1.5	0.5	1.0
Public administration	5.7	5.0	0.9	0.5	0.5
Overall average all industries	9.4	7.9	2.5	0.8	1.5

Although alcohol is the primary contributor to overall rates of SUDs, the addictiveness and lethality of pain medication use disorders make this an important labor force concern. Generally, the industries with more alcohol use disorders in their labor forces have more illicit drug, pain medication, and marijuana use disorders. Industries with relatively low rates of alcohol use disorders have correspondingly low rates of other drug use disorders. The prevalence of pain medication and heroin use disorders is low among working adults, only 0.8% in 2012, 2013, and 2014. Entertainment, recreation, and food service stand out with double the national workforce average

of opioid use disorders (1.6% vs 0.8%). Construction, mining, and other services have higher than average opioid use disorders. Marijuana use disorders are relatively uncommon within the labor force. Overall, 1.5% of employees have a marijuana use disorder, but again, workers in the entertainment, recreation, hospitality, and food service sector have rates much higher than average (3.5%), as do construction (2.3%) and retail (2.1%). Mining (0.1%), public administration (0.5%), and durable goods manufacturing (0.6%) have lower rates.

Workplace Absenteeism

Employees with SUDs miss substantially more work days than other employees (Table 4). The typical worker misses an average of 10.5 days annually for illness, injury, or reasons other than vacation and holidays. Workers with SUDs miss nearly 50% more days than their peers, averaging 14.8 days a year of unscheduled leave. Workers with pain medication use disorders miss nearly three times as much work as their peers, 29 days. Most of these extra days of missed work, more than 22 days annually, are associated with illness and injury. Workers in recovery, workers who report receiving substance use treatment at some time in the past and who have not had a SUD within the last 12 months, miss the fewest days of any group. They are less likely than even the general workforce to miss work days (9.5 days for workers in recovery and 10.5 days for other workers).

TABLE 4

Workers in Recovery Have the Lowest Turnover and Absenteeism Rates

	General Work Force	Any SUD	Alcohol Use Disorder	Illicit Drug Use Disorder	Pain Med Use Disorder	Marijuana Use Disorder	In Recovery
Missed work days for injury, illness past year	8.4	10.2	9.4	13.0	22.2	10.6	8.3
Missed work days for other reasons past year	2.1	4.7	4.7	5.4	6.8	4.8	1.2
Total missed work days past year	10.5	14.8	14.1	18.4	29.0	15.4	9.5
Worked for more than one employer in last year (%)	25	36	36	42	42	45	23

Turnover and Replacement

Table 4 also summarizes differences in job turnover. One-fourth of currently employed workers report having more than one employer in the previous year. Employees with a SUD are much more likely than their peers to report having more than one employer: 36% among workers with any SUD. Workers with a prescription pain medication disorder were even more likely (42%) to have more than one employer. Workers in recovery are the group least likely to leave their employers. Their turnover rate is much lower than workers with untreated substance use, and even lower than their peers with no SUD (21% vs 25%).

Health Care Utilization

Although employees with any SUD report greater health care use than their peers, the big difference between groups, as summarized in Table 5, is that workers who have a pain medication use disorder use health care services much more than their peers. Workers in recovery use health care services at slightly lower rates than their peers and less than workers with an untreated SUD.

TABLE 5

Health Care Use is Highest for People with a Pain Medication Use Disorder

	General Work Force	Any SUD	Alcohol Use Disorder	Illicit Drug Use Disorder	Pain Med Use Disorder	Marijuana Use Disorder	In Recovery
Hospitalized overnight last year (%)	7.4	7.9	7.9	9.5	17.0	8.1	7.3
Hospital nights per person last year	0.3	0.3	0.3	0.5	0.6	0.5	0.2
Emergency room visits last year	0.4	0.6	0.5	1.0	2.0	0.8	0.4
Outpatient visits last year	2.6	2.3	2.4	2.7	3.9	2.5	2.6

Hospital Use People with pain medication use disorders are more than twice as likely as their peers to have been hospitalized in the previous 12 months and, when hospitalized, stay more than twice as long. No other substance-using group, including workers who misused pain medications, shows so great a difference in hospital use. Workers in recovery have the lowest hospital use of any group.

Patterns of hospital use of workers' families are similar. People with a current or past-year SUD were more likely to be hospitalized and stay longer than either individuals with no current SUD or those in recovery. The average per person number of hospital nights in the previous year were 0.65 nights for individuals with a current SUD, 0.51 for individuals in recovery, and 0.34 nights for individuals with no SUD and no prior SUD treatment.

Emergency Room Use Workers with pain medication use disorders use hospital emergency services (ED) an average of two visits annually, more than four times as often as workers with no SUDs, or as workers in recovery. Workers with an illicit drug use disorder or who misuse pain medications had twice the rate of ED use as their peers. Family members with an SUD also use more emergency services than individuals with no SUDs (0.81 visits and 0.55 visits, respectively), and more than individuals in recovery (0.77 visits).

Ambulatory Medical Care Workers with a pain medication use disorder are outliers. They report an average of nearly four primary care visits annually. All other groups clustered around 2.5 visits annually. Family members in recovery used more outpatient services (3.2 annually) than the general population (2.8) or those with an SUD (2.7). Greater ambulatory care use by people in recovery may be associated with demographics. People in the general population who report prior substance use treatment but no current SUD are generally older. Only 10% are younger than 25 years, compared with 27% of people with no SUD and 35% of people with an SUD being under 25 years.

Comorbid Substance Use

Employees who have a SUD often are dependent on more than one drug. Four in 10 workers who had an illicit drug use disorder had comorbid alcohol use disorder. Sixty percent had a comorbid marijuana use disorder, and 28% had a pain medication use disorder. Similarly, 38% of employees with pain medication use disorders have alcohol use disorders, and 16% had marijuana use disorders. A similar pattern of comorbidity is seen among employees with marijuana use disorders. Alcohol use exhibits a different pattern: only 13% had an illicit drug use disorder, 3% were dependent on pain medications, and 8% were dependent on marijuana.

Serious Psychological Distress, Depression, and Anxiety

The NSDUH interview uses a six-item scale to measure respondents' psychological distress in the prior 12 months. The symptoms assessed include feeling hopeless, feeling nervous, feeling restless or fidgety, feeling sad or depressed, feeling everything was an effort, and feeling worthless. Table 6 highlights the sharp difference between the general workforce and workers in recovery, on the one hand, and workers with current SUDs, especially workers with pain medication use disorders. Fewer than 4 in 100 workers in the general labor force report symptoms of serious psychological distress. Only 3 in 100 workers in recovery report serious distress. Although workers with any SUD and those with alcohol or illicit drug use disorder were more likely to report serious distress than their peers with no current SUD (12%, 11%, and 20%, respectively), it is workers with pain medication disorders who stand out. Workers with pain medication use disorders report serious distress seven times more frequently (28%) than peers without an SUD. A similar pattern, though not as extreme, can be seen in the prevalence of major depressive episodes and anxiety in the pre-

vious year. In the general workforce and among workers in recovery, rates of depression and anxiety are similarly low (between 5% and 7%). Among workers with SUDs, and especially among workers with pain medication use disorders, depression and anxiety are much more common. Anxiety and depression are twice as common among workers with any SUD, and four times more likely among those with a pain medication disorder.

TABLE 6

Behavioral Health and Nicotine

	General Work Force	Any SUD	Alcohol Use Disorder	Illicit Drug Use Disorder	Pain Med Use Disorder	In Recovery
Serious psychological distress past year (%)	4	12	11	20	28	3
Anxiety disorder past year (%)	5	11	11	14	20	6
Depression past year (%)	6	11	11	15	22	7
Percent cigarette use - past 30 days use (%)	23	49	44	66	68	19
Percent nicotine dependence past year (%)	12	25	22	47	48	10

Smoking

Workers with SUDs are much more likely than their peers to smoke cigarettes and to be dependent on nicotine. Compared with their peers without an SUD, twice as many workers who have a SUD, and nearly three times as many workers with a pain medication disorder, marijuana, or illicit drug use disorder, reported smoking in the last 30 days. Twice as many employees with any SUD are dependent on nicotine than are their peers: 25% versus 12%, and nearly half of workers with an illicit drug use disorder or pain medication use disorder are nicotine dependent. Workers in recovery are much less likely to smoke or to be nicotine-dependent than workers with a SUD and have rates even lower than workers who have never had a SUD.

Driving Under the Influence

In 2014, driving while under the influence of alcohol or other drugs was a factor in the deaths of 9967 people, nearly one-third (31%) of all traffic-related fatalities in the U.S.[26] The 1.3 million arrests for impaired driving every year may represent only about 1% of the actual alcohol and drug-impaired driving incidents.[27–29] The National Highway Traffic Safety Administration (NHTSA) esti-

mates that driving while under the influence of alcohol or drugs (DUI) costs the United States more than $44 billion each year in prosecution, higher insurance rates, higher taxes, medical claims, and property damage.[30]

Nearly two-thirds (64%) of workers with an alcohol use disorder report DUI at least once in the prior year. Similar high rates of impaired driving are seen among workers with a drug use disorder (61%), and with a pain medication use disorder (54%). In the general population of working adults, 16% report driving while under the influence at least once. Only 11% of workers in recovery reported DUI, the lowest rate of any group studied.

Costs of SUDs to Employers

Cost of Avoidable Health Care Use Employers who self-insure and provide individual coverage pay $1729 per employee with no SUD each year (Fig. 2; Estimates of the costs of workers' health care use from the NSDUH are likely to be lower than actual costs because the survey does not inquire about medications or laboratory tests, and 12-month recall may be imprecise.) A worker with an SUD uses health care services that cost his/her employer $2197. The difference is primarily a result of greater emergency department use by the latter. Workers with a pain medication use disorder cost more than twice that much as workers with no SUD: $5586. Emergency department use of workers with a pain medication disorder is four times that of workers with no SUDs and twice that of workers with any other SUD. These differences in health care use are likely reflections of greater illness and injury of workers with SUDs and especially among workers with pain medication disorders. The latter are twice as likely as their peers to report their health status to be fair or poor (14.1% vs 7.0%), and workers with any SUD are nearly half as likely to report fair or poor health (10%).

FIGURE 2

Employers' per capita health care costs.

Health care costs of workers in recovery are nearly identical with those of workers with no current or past substance use conditions. On the basis of self-reported use, workers in recovery had an average annual cost $91 per year less than their peers who have never had a SUD. The pattern of health care costs of family members are similar to those of workers. Annual hospital, emergency, and outpatient costs for a person with an SUD were $3440, for a person in recovery, $3071, and for an individual with no SUD, $2173. The calculator produces estimates of employers' costs of health care by multiplying the number of the firm's employees by state and industry sector SUD prevalence rates, the difference in health care use by workers with SUDs and family members with SUDs, published national averages of per day and per visit paid claims amounts,[16,31,32] and the national average proportion of individual and family health care premiums generally paid by employers.

Cost of Missed Work Table 7 illustrates by industry the per capita costs associated with the extra days of unscheduled leave used by workers with any SUD and by workers with a pain medication use disorder. Actual costs for an individual employer of unscheduled leave will vary based on employee wages and fringe, PTO policies, work duties, and substitution costs. The calculator produces estimates of employers' costs of missed work by multiplying the number of employees by state and industry sector SUD prevalence rates, the difference in the number of work days missed annually, and that industry sector's fully loaded daily wage from the August 2016 Bureau of Labor Statistics.

TABLE 7

Extra Costs of Missed Work by Industry

	Per Capita Annual Extra Cost of a with an SUD, $	Per Capita Annual Extra Cost for a Worker with a Pain Medication Use Disorder, $	Per Capita Annual Costs Avoided for Each Worker in Recovery ($)
Agriculture	$187	$1,668	$90
Mining	$881	$(764)	$422
Construction	$1,040	$455	$499
Manufacturing: Durable goods	$1,399	$14,830	$671
Manufacturing nondurable goods	$1,692	$1,677	$812
Transportation and warehousing	$383	$3,125	$184
Information, communications	$3,941	$27,173	$1,891
Wholesale durable	$(893)	$2,468	$(428)
Wholesale nondurable	$886	$2,463	$425
Retail trade	$1,284	$225	$616
Finance, insurance, real estate	$1,169	$2,373	$561
Professional, mgmt., admin	$2,604	$6,057	$1,250
Education, health, social services	$887	$5,062	$425
Entertainment, recreation, food	$795	$2,490	$381
Public administration	$1,406	$(162)	$674
Other services	$945	$2,417	$453

Negative numbers are likely associated with small numbers of workers in some categories. Mining represents 0.6% of the NSDUH employed respondents, so a small number of workers with an SUD in that sector with unusually high or low absenteeism may skew responses.

Turnover Costs Replacing workers is expensive, averaging around 21% of the job's annual salary to recruit and retrain for a vacant position.[33,34] Costs are greater for workers with greater education and training, and lower for workers paid less and with fewer skills. From the NSDUH inter-

views, about one in four currently employed adults had more than one employer in the previous 12 months. In some industries, for example, in entertainment, lodging, hospitality, and food service, turnover is greater (36% per year). In others, such as public administration, turnover is less common (18%). Workers with an untreated SUD had much higher rates of turnover. In entertainment, lodging, hospitality, and food service, nearly half (49%) of workers had more than one employer in the prior year. Other sectors also had high turnover rates among workers with SUDs: mining (41%), information and communication (43%), and other services (44%). This sector comprises establishments, not classified to any other sector, primarily engaged in repairing, or performing general or routine maintenance, on motor vehicles, machinery, equipment and other products to ensure that they work efficiently; providing personal care services, funeral services, laundry services and other services to individuals, such as pet care services and photo finishing services; organizing and promoting religious activities; supporting various causes through grant-making, advocating (promoting) various social and political causes, and promoting and defending the interests of their members. Table 8 summarizes the percentage of workers who had more than one employer in the past year. The column on the far right of Table 8 shows the extra costs employers bear for turnover and replacement for each employee with an untreated SUD. In sectors with high average salaries, such as information and communications, and higher than average turnover risk by employees with untreated SUDs, replacement costs are considerably higher than average: more than $4000 for each worker with an untreated SUD. The lower industry wages and smaller turnover differential between the general workforce and workers with a SUD in sectors such as agriculture result in smaller turnover costs per worker with an untreated SUD.

TABLE 8

Turnover Costs

	Average Sector Turnover rate (%)	Turnover Rate for Workers with SUDs (%)	Workers in Recovery (%)	Per Capita Turnover Cost[a] ($)	Per Capita Turnover Cost if Any SUD	Per Capita Excess Turnover Cost if SUD	Per Capita Savings of Worker in Recovery
Agriculture	20	27	20	$1,535	$2,046	$512	$537
Mining	27	41	27	$5,044	$7,597	$2,553	$2,491
Construction	27	32	26	$4,440	$5,317	$877	$987
Manufacturing, nondurable	19	32	19	$3,085	$5,052	$1,968	$2,074
Manufacturing, durable	19	28	18	$2,601	$3,947	$1,347	$1,393
Transportation, utilities	21	31	21	$2,871	$4,284	$1,413	$1,413
Information, communications	24	43	23	$5,068	$9,137	$4,069	$4,140
Wholesale, durable	21	34	21	$3,681	$5,924	$2,243	$2,301
Wholesale, nondurable	20	26	21	$2,125	$2,682	$557	$488
Retail	26	39	26	$2,682	$4,075	$1,393	$1,393
Finance, insurance real estate	21	28	20	$3,974	$5,299	$1,325	$1,451
Professional, mgmt., admin	25	32	25	$4,506	$5,767	$1,262	$1,322
Education, health, social services	25	36	25	$3,762	$5,417	$1,655	$1,655
Entertainment, recreation, food	36	49	36	$3,167	$4,271	$1,104	$1,133
Public administration	18	25	18	$2,759	$3,711	$953	$953
Other services	26	44	27	$3,490	$5,862	$2,372	$2,282

[a] Average turnover, recruitment, replacement, and training costs estimated at 21.4% of annual salary.

Overall Costs of Untreated SUDs Employers' costs for untreated SUDs are substantial. Table 9 summarizes the percentage of each sector's workforce that has an untreated SUD, and the average per capita cost to an employer for each employee who has an SUD. The per capita cost is the sum of employers' costs for avoidable health care use, absenteeism, and turnover of a worker with an untreated SUD in each industry sector. Information and communications, and professional services employers bear the highest costs. But other sectors with higher than average rates of SUDs in their workforces, such as construction and entertainment, lodging, hospitality, and food service, are exposed to significant costs because SUDs are so common. Greater use of health care by a family member who has an untreated SUD adds an extra $1267 per person annually to the cost of coverage for employers who support a portion of family health insurance premiums (http://kff.org/state-category/health-costs-budgets/employer-based-health-insurance-premiums/).

TABLE 9

Per Capita Costs to Employers for Each Untreated Worker with an SUD

	Prevalence of SUD (%)	Excess Cost for Each Employee With an SUD ($)
Agriculture	8.6	$2,689
Mining	10.3	$8,934
Construction	15.0	$6,813
Manufacturing, nondurable	8.0	$6,907
Manufacturing, durable	8.4	$6,096
Transportation, utilities	7.5	$5,123
Information, communications	9.7	$13,534
Wholesale, durable	7.4	$5,487
Wholesale, nondurable	10.6	$4,024
Retail	9.8	$5,815
Finance, insurance real estate	9.1	$6,925
Professional, mgmt., admin	10.3	$8,827
Education, health, social services	6.4	$6,760
Entertainment, recreation, food	15.3	$5,523
Public administration	5.7	$5,573
Other services except publ. admin	8.7	$7,264
Overall average	9.4	$6,643

COST AVOIDANCE WHEN WORKERS RECEIVE TREATMENT AND RECOVER FROM ADDICTION

Across the three NSDUH surveys, 7988 currently employed adults (10.3% of the 77,466 working adults in the 3-year NSDUH sample) report receiving substance use treatment at some time in their lives and did not have a SUD at any time in the prior 12 months. From these respondents, it is possible to estimate the costs employers avoid for each worker who receive treatment and recovers.

Health care utilization and costs are lower for workers in recovery than for workers with an untreated SUD, by an average of $536 per year. A family member in recovery costs employers $262 less in health care claims than a family member with an untreated SUD.

Workers in recovery stay with one employer at nearly identical rates as other workers in that sector (Table 8). Compared with the costs of turnover and replacement of workers with a SUD, workers in recovery save employers a substantial amount in every sector. Savings range from more than $4000 for each worker in recovery in information and communications to a little over $500 in agriculture.

Workers in recovery take much less unscheduled leave than their peers with untreated SUDs. In fact, they take even fewer days of unscheduled leave than workers in their industry who have never had a SUD. They miss work a week less than workers with an SUD, and a day less than workers who have never had a SUD. Table 7 summarizes the per capita costs employers avoid from the lower absence rates of a worker in recovery. Note that among employees in recovery in the durable wholesale goods sector, the cost of unscheduled leave is greater than costs of employees with an untreated SUD. The reason for this discrepancy is not apparent from the data.

Employers can avoid a significant amount of unnecessary and unproductive costs if they can assist their employees to receive treatment and recover from their SUDs. Table 10 summarizes that the average costs employers avoid annually for each employee who recovers from an SUD is more than $3200. For some industries, the savings are significantly higher: more than $8400 for each employee in recovery in information and communications industries, and more than $4300 in professional, management, and administrative industries.

TABLE 10

Employer Costs Avoided for Each Worker in Recovery

Industry Sector	Savings Per Worker in Recovery
Agriculture	$1,155
Mining	$3,890
Construction	$2,373
Manufacturing, nondurable	$3,823
Manufacturing, durable	$3,495
Transportation, utilities	$2,252
Information, communications	$8,466
Wholesale, durable	$1,806
Wholesale, nondurable	$1,900
Retail	$3,134
Finance, insurance real estate	$2,950
Professional, mgmt., admin	$4,322
Education, health, social services	$2,998
Entertainment, recreation, food	$2,356
Public administration	$2,815
Other services except publ. admin	$3,773
Overall average all occupations	$3,219

DISCUSSION

Seventy-five percent of adults experiencing an untreated SUD are in the workforce. Few business leaders are aware of the avoidable costs that treatment and recovery from addiction can generate. Employers remain largely in the dark about how substance use—and in particular, prescription drug misuse—impacts their companies and how to reduce their risks and costs. The analyses reported here and the free online tool, The Real Cost of Substance Use in Your Workforce (https://forms.nsc.org/substance-use-employer-calculator/index.aspx), can help individual companies understand how untreated substance use in their workforce can lead to unscheduled leave or missed work, job turnover, and extra health care costs. The annual cost of a single employee with an untreated SUDs ranges from $2600 in agriculture to more than $13,000 in the information and communications sectors.

The prevalence and costs of substance use vary by industry. Four industries—construction, entertainment, recreation, and food service—have twice the national average of employees with untreated SUDs. Industries that have higher proportions of workers with alcohol use disorders also have more workers with illicit drug, pain medication, and marijuana use disorders. Costs for each employee with an untreated SUD are greater in industries with highly skilled or highly compensated employees, such as the information or communications industries, even though the prevalence of SUDs in their workforces may be lower than, for example, construction or mining. To use the Calculator, employers simply input basic information into the online tool: industry sector, worksite location, and number of employees. The online calculator combines that information with prevalence and cost data from the NSDUH to produce an immediate report showing the likely number of their employees and their family members who have any type of SUD, and with specific types of SUDs (alcohol, marijuana, prescription pain, illicit drug). The report shows how much and where untreated SUDs are costing them, and potential costs avoided if their employees and family members get treatment.

Investing in helping workers get effective substance use treatment can, on average, avoid $3200 in costs annually for each worker who recovers. Workers in recovery who have received specialized substance use treatment and who have been in recovery for more than a year are less likely to miss work. They miss 5 days fewer than workers with a SUD and 1 day less than the general workforce. Workers in recovery also have lower turnover rates, are less likely to be hospitalized, and have fewer doctor's visits.

LIMITATIONS

Study findings should be interpreted in the context of several limitations. First, the NSDUH is based on respondent self-report. Self-report is easy to implement, affordable, and provides immediate results. It is thus relied upon for national public health surveys.[35] However, the validity of self-report as a screening method for stigmatized health behaviors is complex.[36,37] Self-report of substance use was not validated with a urine or blood test. Social desirability bias, patient characteristics, interview setting, population, interviewer traits, and sensitivity of subject matter can influence the validity of self-report.[38,39] The NSDUH attempts to reduce these biases by administering most questions with audio computer-assisted self-interviewing (ACASI) to provide the respondent with a highly private and confidential mode for responding to questions in order to increase the level of honest responses to questions about illicit drug use and other sensitive behaviors. Less sensitive items are administered by interviewers using computer-assisted personal interviewing (CAPI). Reports on results from NSDUH data are available on the SAMHSA web site (http://www.samhsa.gov/data/NSDUH.aspx).[40] But, studies have demonstrated that subjects often under-report substance use, based on perceived stigma associated with use.[41] Thus, estimates derived from this as well as previous studies may be considered conservative. Second, the NSDUH is a cross-sectional study. We are unable to assess any causal relationships between substance use and work status or performance. A third limitation is that NSDUH data for 2012, 2013, and 2014 were pooled to increase the analytic sample size. As such, the prevalence estimates for alcohol and drug use may not account for possible time trends and cohort effects from different survey years. Of particular concern is the very rapid increase in opioid deaths in the last few years, which may represent increases in the prevalence of prescription opioid, heroin, and fentanyl use too recent to

be picked up in our sample.[42] However, the self-reported prevalence of pain medication use disorders among working adults was flat across the 3 years (0.7%; 0.7%; and 0.6%) as were self-reported last month misuse of pain medications (2.0%; 1.6%; 1.6%). Finally, the NSDUH does not ask questions about some key interpersonal (eg, temperament and personality), contextual (eg, neighborhood and worksite), or work-performance (presenteeism, job stress, and conflict) factors that may be of relevance to interpreting the impact of alcohol and drug use on employment.

CONCLUSION

Despite these limitations, this study contributes understanding the occupational impact of substance use by presenting a simple estimate of the financial toll faced by individual businesses, illuminating an area with significant potential for cost reduction and improved productivity. It provides employers tools to identify opportunities for health and productivity savings while also improving the health of employees and their families. Most importantly, it demonstrates the significant costs that employers can avoid if their employee gets treated for their SUDs.

Footnotes

REFERENCES

1. Murthy VH. Facing Addiction in America: Surgeon General's Report on Alcohol, Drugs, and Health. Available at: https://addiction.surgeongeneral.gov/surgeon-generals-report.pdf Accessed September 4, 2017. [PubMed] [Google Scholar]

2. Stahre M, Roeber J, Kanny D, Brewer RD, Zhang X. Contribution of excessive alcohol consumption to deaths and years of potential life lost in the United States. *Prev Chronic Dis* 2014; 11:E109. [PMC free article] [PubMed] [Google Scholar]

3. Rudd RA, Aleshire N, Zibbel JE, Gladden RM. Increases in drug and opioid overdose deaths—United States, 2000–2014. *MMWR Morb Mortal Wkly Rep* 2016; 64:1378–1382. [PubMed] [Google Scholar]

4. Sacks J, Gonzales KR, Bouchery EE, Tomedi LE, Brewer RD. 2010 national and state costs of excessive alcohol consumption. *Am J Prev Med* 2015; 49:e73–e79. [PubMed] [Google Scholar]

5. National Drug Intelligence Center. National Drug Threat Assessment. Washington, DC: U.S. Department of Justice; 2011. [Google Scholar]

6. Harwood HJ, Reichman MB. The cost to employers of employee alcohol abuse: a review of the literature in the United States of America. United Nations Office on Drugs and Crime. *Bull Narcotics* 2000. [Google Scholar]

EXHIBIT 190

A Comparison of Random and Post-Accident Urine Opiate and Opioid Tests

James W. Price

Routledge
Taylor & Francis Group

A COMPARISON OF RANDOM AND POST-ACCIDENT URINE OPIATE AND OPIOID TESTS

James W. Price, DO, MPH

St. Mary's Occupational Medicine Clinic, Evansville, Indiana, USA

Opioid use is associated with poor reaction time, attention, balance and memory posing a potential threat to workplace safety. The purpose of this study is to determine if there is a statistical association between opiate/opioid use and work related accidents as measured by urine drug tests by comparing the proportion of opiate/opioid laboratory positive urine specimens for postaccident verses random samples. The prevalence of laboratory positive opiate/opioid tests, the odds ratio, Fisher's exact probability test and the population attributable risk were calculated for each comparison. This study found a statistically significant difference for opiate/opioid results favoring the post-accident group.

KEYWORDS. Opiate, opioid, urine drug test, workplace accidents, impairment, prescription drug use

INTRODUCTION

The use and abuse of opiate and opioid medications is on the rise posing a potential danger to workplace safety. An analysis of Louisiana Worker's Compensation claims from 1999 to 2009 found a significant cumulative yearly increase in morphine milligram equivalents prescribed for acute and chronic pain. The largest increase was for long-acting opioids.[1] Most employees using these drugs have a legitimate prescription, but many do not take the medication as prescribed. The prevalence of prescription drug abuse and dependency in patients receiving legitimate opiate therapy for chronic pain is not insignificant; ranging from 17.8 to 39%.[2–4]

Drug testing is not very helpful in these cases as the prescribed medication forces the medical review officer to make the determination that the drug test is negative. This is a concern as opioid use is associated with poor performance on measures of reaction time, attention, balance, and memory posing a potential threat to workplace safety.[5] This issue is at the core of the following question. Is there an association between opiate and opioid use and workplace accidents?

METHODS

The purpose of this study is to determine if there is a statistical association between opiate and opioid use and work related accidents as measured by urine drug tests. This is a case-control study comparing the proportion of opiate/opioid laboratory positive urine specimens for post-accident verses random samples. The population consists of employees from a variety of industries located in Southern Indiana, Missouri, Arkansas, Kentucky, and Ohio. There is no distinction made regarding gender, age, or the safety sensitivity of their duties. The study group is made up of all individuals that presented for nine-panel post-accident urine drug testing from January 3, 2008, to June 1, 2013. The workplace accidents included slips, trips and falls, sprains, strains and fractures, burns and lacerations, and injury producing and non-injury producing motor vehicle collisions. The urine samples were collected during the initial

Address correspondence to James W. Price, DO, MPH, St. Mary's Occupational Medicine Clinic, 2230 Lynch Rd., Evansville, IN 47711. E-mail: pric26@bellsouth.net

medical encounter which in most cases was within 24 hours of the injury and never greater than 72 hours post accident. The control group is made up of all individuals that presented for nine-panel (amphetamines, cocaine, marijuana, opiates, and phencyclidine) random urine drug testing during the same period. They were selected in accordance with the individual company's drug testing policy. The frequency of random testing was not available for assessment.

The urine specimens were collected from various sites by trained personnel following standardized collection procedures established by the U.S. Department of Transportation. Each specimen was tested at Clinical Reference Laboratory of Lenexa, Kansas; A U.S. Department of Health and Human Services certified laboratory. A two-step process was used to assess the samples beginning with screening of the samples using the Siemens ADVIA 2400 immunoassay®. Positive screens were confirmed by gas chromatography-mass spectroscopy (GC/MS) using an Agilent Instruments 5975®. All mass spectroscopy confirmation analyses were performed in selective ion monitoring mode. The laboratory also performs validity testing to assess each specimen for substitution and adulteration. Each test was forwarded to a certified medical review officer for interpretation of drug and validity test results as well as review of the integrity of the collection and testing process.

The data was acquired from an administrative database maintained by Clinical Reference Laboratory as an Excel® spreadsheet. The data was converted to a usable format and processed using MedCalc version 12.7.0®.

The samples were first compared without controlling for other potentially impairing substances. Then any sample that tested positive for one or more substances other than an opiate or opioid was eliminated from the study to correct for the confounding effect of other potentially impairing substances. The prevalence of positive laboratory opiate/opioid tests, the odds ratio and 95% confidence interval of accident involvement, Fisher's exact probability test, and the population attributable risk (PAR) were calculated for each of the comparisons.[6,7] The PAR indicates the proportion of cases that would not occur in a population if the studied factor were eliminated.[8] The Institutional Review Board of St. Mary's Medical Center (Evansville, IN) approved the study design and granted an informed consent waiver.

RESULTS

The study began with 4,756 urine samples with 2,161 post-accident specimens and 2,595 random specimens. One hundred eighty of the samples were confirmed positive for drugs other than opiates or opioids. These samples were eliminated from the study to control for the potentially impairing effects of the substances, leaving 2,070 post-accident and 2,506 random samples.

The post-accident group had 113 positive opiate screens, 4 positive methadone screens, and 29 positive propoxyphene screens, totaling 146 positive screens prior to controlling for other confounding substances. The post-accident group had 94 positive opiate screens, 4 positive methadone screens, and 28 positive propoxyphene screens, totaling 126 positive screens after controlling for other confounding substances. The random group had 47 positive opiate screens, 5 positive methadone screens, and 8 positive propoxyphene screens, totaling 60 positive screens prior to controlling for other confounding substances. The random group 40 positive opiate screens, 5 positive methadone screens, and 7 positive propoxyphene screens totaling 52 positive screens after controlling for other confounding substances (Table 1).

The pre-control post-accident group had 86 samples of the 146 positive screens (58.9%) that were confirmed laboratory positive for an opiate or opioid. The pre-control random group had 23 samples of the 60 positive screens (38.3%) that were confirmed laboratory positive for an opiate or opioid (Table 2). The odds ratio comparing the total positive confirmed laboratory opiate or opioid specimens prior to controlling for other substances was 4.6347

(2.9149–7.3691) with a *p*-value <.0001 and PAR of 3.12%.

GC/MS confirmation of individual opiates/ opioids prior to controlling for polypharmacy produced the following data and subsequent analysis (Table 2). There were 19 positive post-accident morphine urine drug tests and 1 positive random morphine test. The odds ratio comparing these samples was 23.0093 (3.0777–179.0236) with *p* = .0022 and PAR = .84%. There were 30 positive post-accident hydrocodone urine drug tests and 8 positive random urine drug tests. The odds ratio

evaluating these samples was 4.5524 (2.0827– 9.9510) with *p* = .0001 and PAR = 1.08%. There were two positive post-accident hydromorphone urine drug tests and one positive random urine drug test. The odds ratio for these samples was 2.4030 (0.2177–26.5195) and *p* = .4742 and PAR = .05%. There were three positive post-accident codeine urine drug tests and two positive random urine drug tests with the odds ratio equaling 1.8092 (.3009– 10.7967), *p* = .5189, and PAR = .06%. There were 29 positive post-accident propoxyphene urine drug tests and 7 positive random urine

TABLE 1. Prevalence of Laboratory Positive Urine Drug Tests

Screening	Confirmation Testing	Post-Accident Polypharmacy Not Controlled (n = 2,161)	Post-Accident Polypharmacy Controlled Opioids Only (n = 2,070)	Random Polypharmacy Not Controlled (n = 2,595)	Random Polypharmacy Controlled Opioids Only (n = 2,506)
Average urine creatinine		129.22	128.81	116.11	115.85
Amphetamine (class) screen		51	9	53	6
	GC/MS amphetamine	37	0	46	0
	GC/MS methamphetamine	6	0	5	0
Barbiturate screen		4	0	5	1
	GC/MS Butalbital	3	0	4	0
	GC/MS Amobarbital	0	0	0	0
	GC/MS Pentobarbital	1	0	0	0
	GC/MS Secobarbital	0	0	0	0
	GC/MS Phenobarbital	0	0	0	0
	GC/MS Butabarbital	0	0	0	0
Benzodiazepine screen		67	40	57	37
	GC/LC/MS Nordiazepam	6	0	2	0
	GC/LC/MS Oxazepam	15	0	11	0
	GC/LC/MS Diazepam	0	0	0	0
	GC/LC/MS Temazepam	12	0	7	0
	GC/LC/MS Ethylflurazepam metabolite	4	0	1	0
	GC/LC/MS Alprazolam metabolite	8	0	6	0
	GC/LC/MS Lorazepam	4	0	1	0
Cocaine metabolites screen		2	0	1	0
	GC/MS cocaine metabolites	2	0	1	0
Marijuana metabolites screen		26	1	27	0
	GC/MS marijuana metabolite	26	0	27	0
Methadone screen		4	4	5	5
	GC/MS methadone	3	2	4	4
	GC/MS methadone metabolite (EDDP)	3	2	4	4
Opiate screen		113	94	47	40
6-Acetylmorphine screen		0	0	0	0
	GC/MS morphine	19	17	1	1
	GC/MS hydrocodone	30	24	8	6
	GC/MS hydromorphone	2	1	1	1
	GC/MS codeine	3	3	2	2
Phencyclidine screen		1	0	0	0
	GC/MS phencyclidine	1	0	0	0
Propoxyphene metabolite screen		29	28	8	7
	GC/MS propoxyphene metabolite	29	28	8	7

TABLE 2. Odds Ratios and *p*-Values for GC/MS Confirmed Laboratory Positive Opiate/Opioid Urine Drug Tests Prior to Being Controlled for Other Potentially Impairing Medications

	Aggregate of all opiate/opioid results				
	Drug Positive	Drug Negative	Total	Odds Ratio	4.6347
Post-accident	86	2,075	2,161	95% CI	2.9149–7.3691
Random	23	2,572	2,595	Z statistic	6.482
Total	109	4,647	4,756	*p*-Value	<.0001
		Morphine			23.0093
Post-accident	19	2,142	2,161	95% CI	3.0777–179.0236
Random	1	2,594	2,595	Z statistic	3.055
Total	20	4,736	4,756	*p*-Value	= .0022
		Hydrocodone			4.5524
Post-accident	30	2,131	2,161	95% CI	2.0827–9.9510
Random	8	2,587	2,595	Z statistic	3.799
Total	38	4,718	4,756	*p*-Value	= .0001
		Hydromorphone			2.4030
Post-accident	2	2,159	2,161	95% CI	.2177–26.5195
Random	1	2,594	2,595	Z statistic	.716
Total	3	4,753	4,756	*p*-Value	= .4742
		Codeine			1.8092
Post-accident	3	2,158	2,161	95% CI	.3009–10.7967
Random	2	2,593	2,595	Z statistic	.645
Total	5	4,751	4,756	*p*-Value	= .5189
		Propoxyphene			5.0289
Post-accident	29	2,132	2,161	95% CI	2.1986–11.5028
Random	7	2,588	2,595	Z statistic	3.826
Total	36	4,720	4,756	*p*-Value	= .0001
		Methadone			.9005
Post-accident	3	2,158	2,161	95% CI	.2013–4.0279
Random	4	2,591	2,595	Z statistic	.137
Total	7	4,749	4,756	*p*-Value	= .8909

Population attributable risk = 3.12%.
Population attributable risk = .84%.
Population attributable risk = 1.08%.
Population attributable risk = 0.05%.
Population attributable risk = .06%.
Population attributable risk = 1.07%.
Population attributable risk <.01%.

drug tests. The odds ratio examining these samples was 5.0289 (2.1986–11.5028), *p* = .0001, and PAR = 1.07%. There were three positive post-accident methadone urine drug tests and four positive random urine drug tests. The odds ratio for this comparison was .9005 (.2013–4.0279), *p* = .8909 and PAR < .01%.

The controlled post-accident group had 75 samples of the 126 positive screens (59.5%) that were confirmed laboratory positive for an opiate or opioid. The controlled random group had 21 samples of the 60 positive screens (35.0%) that were confirmed laboratory positive for an opiate or opioid (Table 3). The odds ratio comparing the total confirmed laboratory positive opiate or opioid specimens after controlling for other substances was 4.4486 (2.7322–7.2432) with a *p*-value < .0001 and PAR of 2.81%.

Data obtained from GC/MS confirmation of individual opiates/opioids after controlling for

polypharmacy was used for the following analysis (Table 3). There were 17 positive post-accident morphine urine drug tests and 1 positive random morphine test and the odds ratio comparing these samples was 20.4728 (2.7581–156.0017) with $p = 0.0032$ and PAR = .78%. There were 24 positive post-accident hydrocodone urine drug tests and 6 positive random urine drug tests. The odds ratio evaluating these samples was 4.8993 (1.9989–12.0085), the p-value was .0005, and PAR = .93%. There was one positive post-accident hydromorphone urine drug tests and one positive random urine drug test. The odds ratio for these samples was 1.2107 (.0757–19.3694), $p = .4742$, and PAR < .01%. There were three positive post-accident codeine urine drug tests and two positive random urine drug test. The odds ratio for this assessment was 1.8171 (.3013–10.8855) with $p = .5132$ and PAR = .06%. There were 28 positive post-accident propoxyphene urine drug tests and 7 positive random urine drug test.

TABLE 3. Odds Ratios and p-Values for GC/MS Confirmed Laboratory Positive Opiate/Opioid Urine Drug Tests Controlled for Other Potentially Impairing Medications

	Aggregate of all opiate/opioid results				
	Drug Positive	Drug Negative	Total	Odds Ratio	4.4486
Post-accident	75	1,995	2,070	95% CI	2.7322–7.2432
Random	21	2,485	2,506	Z statistic	6.001
Total	96	4,480	4,576	p-Value	<.0001
		Morphine			20.7428
Post-accident	17	2,053	2,070	95% CI	2.7581–156.0017
Random	1	2,505	2,506	Z statistic	2.946
Total	18	4,558	2,576	p-Value	= .0032
		Hydrocodone			4.8993
Post-accident	24	2,046	2,070	95% CI	1.9989–12.0085
Random	6	2,500	2,506	Z statistic	3.474
Total	30	4,546	4,576	p-Value	= .0005
		Hydromorphone			1.2107
Post-accident	1	2,069	2,070	95% CI	.0757–19.3694
Random	1	2,505	2,506	Z statistic	.135
Total	2	4,574	4,576	p-Value	= .8925
		Codeine			1.8171
Post-accident	3	2,067	2,070	95% CI	.3013–10.8855
Random	2	2,504	2,506	Z statistic	.654
Total	5	4,571	4,576	p-Value	= .5132
		Propoxyphene			4.8952
Post-accident	28	2,042	2,070	95% CI	2.1339–11.2298
Random	7	2,499	2,506	Z statistic	3.749
Total	35	4,541	4,576	p-Value	=.0002
		Methadone			.6049
Post-accident	2	2,068	2,070	95% CI	.1107–3.3061
Random	4	2,502	2,506	Z statistic	.580
Total	6	4,570	4,576	p-Value	.5619

Population attributable risk = 2.81%.
Population attributable risk = .78%.
Population attributable risk = .92%.
Population attributable risk <.01%.
Population attributable risk = .06%.
Population attributable risk = 1.08%.
Population attributable risk <.01%.

The odds ratio examining these samples was 4.8952 (2.1339–11.2298) with $p = .0002$ and PAR = 1.08%. There were two positive post-accident methadone urine drug tests and four positive random urine drug tests. The odds ratio for these samples was .6049 (.1107–3.3061) with $p = .5619$ and PAR < .01%.

Only small proportion of the screening tests confirmed positive so one final assessment was performed. Positive opiate/opioid screens that did not have laboratory confirmation by GC/MS were compared to determine if a statistically significant difference existed between the post-accident and random groups after controlling for polypharmacy (Table 4). The post-accident group consisted of 2,000 urine samples that failed to confirm positive by GC/MS for any tested drug of these 52 screened positive for opiates/opioids. There were 2,484 urine samples in the random group with 30 screening positive for opiates/opioids. The generated odds ratio was 2.1836 (1.3836–3.4358) with the p-value equaling .0007 and the PAR being 2.60%.

DISCUSSION

The results of comparing the total confirmed laboratory positive opiate/opioid tests after controlling for other substances did achieve statistical significance with $p < .0001$. The post accident group was 4.45 (OR = 4.4486) times more likely to be taking an opiate or opioid than the random group; indicating an association between opiate/opioid use and workplace accidents. In fact, it appears that 2.81% (PAR) of this population's workplace accidents are related to opiate/opioid use. Comparisons of the individual opiate and opioid concentrations demonstrated similar differences for morphine (OR = 20.7428), hydrocodone (OR = 4.8993), and propoxyphene (OR = 4.8952). Even urine opiate/opioid screens that failed GC/MS confirmation were significantly more prevalent in the post-accident group (OR = 2.1836) with 2.60% of workplace accidents directly related to this finding. The reason for confirmation failure is not clear but may be due to false positive screens, or opiate/opioid concentrations below the GC/MS cutoff value (2,000 ng/mL).

There are several limitations of this study. The analysis looked at the presence or absence of opiates and opioids in the urine rather than examining the continuous laboratory value to determine if a linear relationship between urine drug concentration and accident involvement exists.[9] The random group may not be absolutely random due to the variation in frequency of random urine sample collection between types of industry and individual employers within a given industry. The frequency of post-accident urine sample collection may vary in a similar fashion leaving no assurance that the random and the post-accident populations are the same. The number of positive samples was small and may have under powered the study making type II error more likely. Studies with a small sample size will have large confidence intervals and only demonstrate a statistically significant abnormality if there is a large difference between the groups.[10] This may be the reason why hydromorphone, codeine, and methadone failed to reject the null hypothesis. Confounding factors include not correcting for effects of in vivo dilution via creatinine normalization.[11,12]

TABLE 4. Odds Ratio and p-Value for Opiate/Opioid Urine Drug Screens After Being Controlled for Other Potentially Impairing Medications That Failed to Confirm GC/MS Laboratory Positive for Opiates/Opioids

	Drug Positive	Drug Negative	Total	Odds Ratio	2.1836
				Post-accident Mean Creatinine 127.90	
				Random Mean Creatinine 115.70	
Post-accident	52	1,948	2,000	95% CI	1.3877–3.4358
Random	30	2,454	2,484	Z statistic	3.377
Total	82	4,402	4,484	p-Value	.0007

Population attributable risk = 2.60%.

No delineation made for employees performing safety sensitive and non-safety sensitive duties and no indication of when the drugs were taken relative to when the accident occurred and when the accident occurred and when the specimen was provided. However, the findings of this study do appear to be in accordance with the findings of Holman, Stoddard, and Higgins, who determined that patients with orthopedic trauma are significantly more likely than the general population to use prescription opiates prior to injury.[13]

CONCLUSIONS

This study utilized a novel approach to compare the prevalence of opiate/opioid confirmed laboratory positive random to post-accident urine specimens obtained from a population of mid-western American workers representing a variety of industries. This study did find a statistically significant difference ($p < .05$) for opiate/opioid results favoring the post-accident group.

The study cannot be taken as definitive evidence of a causal relationship between opiate/opioid use and work related accidents but the findings are compelling and should be considered by employers developing workplace prescription drug policies. A prospective study looking for a relationship between opiate/opioid use and work related accidents would be needed to directly determine causality. In the absence of such a study, performing a larger retrospective study designed to investigate a possible dose-response relationship for opiate/opioid use and work related accidents would provide clues for causal determination.

REFERENCES

1. Bernacki E, Yuspeh L, Lavin R, Tao X. Increases in the use and cost of opioids to treat acute and chronic pain in injured workers, 1999 to 2009. J Occup Environ Med 2012; 54(2):216–23.
2. Manchikanti L, Pampati V, Damon, K. et al. Prevalence of opioid abuse in interventional pain medicine practice settings: a randomized clinical evaluation. Pain Physic 2001; 4:358–65.
3. Manchikanti L, Pampati V, Damon K. et al. Prevalence of prescription drug abuse and dependency in patients with chronic pain in western Kentucky. J Kentucky Med Assoc 2001b; 101:511–7.
4. Manchikanti L, Fellows B, Damon K, Pampati V, McManus C. Prevalence of illicit drug use among individuals with chronic pain in the commonwealth of Kentucky: an evaluation of patterns and trends. J Kentucky Med Assoc 2005; 103(2):55–62.
5. Kurita G, Lundorff L, Pimenta C, Sjøgren P. The cognitive effects of opioids in cancer: a systematic review. Support Care Cancer 2009; 17(1):11–21.
6. Bland J, Altman D. Statistical notes: the odds ratio. Brit Med J 2000; 320(7247): 1468.
7. Rigby A. Statistical methods in epidemiology. III. The odds ratio as an approximation to the relative risk. Disabil Rehabil 1999; 21(4):145–51.
8. Taylor J. Simple estimation of population attributable risk from case-control studies. Am J Epidemiol 1977; 106(4):260.
9. Altman DG, Royston P. Statistics notes: the cost of dichotomising continuous variables. Brit Med J 2006; 332(7549):1080.
10. Jones S, Carley S, Harrison M. An introduction to power and sample size estimation. Emergen Med J 2003; 20(5):453.
11. Price J. Creatinine normalization of workplace urine drug tests: does it make a difference? J Addict Med 2013; 7(2): 129–32.
12. Price J. Dilution of urine drug tests: is it random? J Addict Med 2013; 7(6):405–9.
13. Holman J, Stoddard G, Higgins T. Rates of prescription opiate use before and after injury in patients with orthopaedic trauma and the risk factors for prolonged opiate use. J Bone Joint Surg 2013; 95(12): 1075–80.

EXHIBIT 191

Peterson-KFF
Health System Tracker

Health Spending

A look at how the opioid crisis has affected people with employer coverage

By Cynthia Cox, Matthew Rae 🐦, and Bradley Sawyer *KFF*

April 5, 2018

With deaths from opioid overdose rising steeply in recent years, and a large segment of the population reporting knowing someone who has been addicted to prescription painkillers, the breadth of the opioid crisis should come as no surprise, affecting people across all incomes, ages, and regions. About four in ten people addicted to opioids are covered by private health insurance and **Medicaid** covers a similarly large share.

Private insurance covers nearly 4 in 10 non-elderly adults with opioid addiction

Insurance status of nonelderly adults with opioid addiction, 2016

Total: 2 million in 2016

Source: Kaiser Family Foundation analysis of the 2016 National Survey on Drug Use and
Health
• Get the data • PNG

The cost of treating opioid addiction and overdose has risen,
even as opioid prescription use has fallen among people with
large employer coverage

SHARE ON X

In this analysis and a corresponding **chart collection**, we use claims data from large employers to
examine how the opioid crisis has affected people with large employer coverage, including employees
and their dependents. The analysis is based on a sample of health benefit claims from the Truven
MarketScan Commercial Claims and Encounters Database, which we used to calculate the amounts paid
by insurance and out-of-pocket on prescription drugs from 2004 to 2016. We use a sample of between
1.2 and 19.8 million enrollees per year to analyze the change from 2004 to 2016 in opioid-related
spending and utilization.

We find that opioid prescription use and spending among people with large employer coverage increased
for several years before reaching a peak in 2009. Since then, use of and spending on prescription opioids
in this population has tapered off and is at even lower levels than it had been more than a decade ago.
The drop-off in opioid prescribing frequency since 2009 is seen across people with diagnoses in all major
disease categories, including cancer, but the drop-off is pronounced among people with complications
from pregnancy or birth, musculoskeletal conditions, and injuries.

Meanwhile, though, the cost of treating opioid addiction and overdose – stemming from both prescription and illicit drug use – among people with large employer coverage has increased sharply, rising to $2.6 billion in 2016 from $0.3 billion 12 years earlier, a more than nine-fold increase.

Trends in prescription opioid use & spending among people with large employer coverage

Opioid prescription use among people with large employer coverage is highest for older enrollees: 22% of people age 55-64 had at least one opioid prescription in 2016, compared to 12% of young adults and 4% of children. Women with large employer coverage are somewhat more likely to take an opioid prescription than men (15% compared to 12%). Opioid prescription use among people with large employer coverage is also higher in the South (16%) than in the West (12%) or Northeast (11%).

Among people with large employer coverage, older enrollees are more likely to have an opioid prescription

Percent of enrollees with large employer coverage and an opioid prescription, by age, 2016

Source: Kaiser Family Foundation analysis of Truven MarketScan data, 2016
• Get the data • PNG

Among people with large employer coverage, the frequency of opioid prescribing increased from 2004 (when 15.7% of enrollees had an opioid prescription) to 2009 (when 17.3% did). After reaching a peak in 2009, the rate of opioid prescribing began to fall. By 2014, the share of people with large employer

coverage who received an opioid prescription (15.0%) was lower than it had been a decade earlier, and by 2016, the share was even lower, at 13.6% (a 21% decline since 2009).

The share of people with large employer coverage taking opioid prescriptions is at its lowest levels in over a decade

Percent of enrollees in large employer plans with an opioid prescription, 2004-2016

Retail prescriptions only; does not include opioids taken in an inpatient setting

Source: Kaiser Family Foundation analysis of Truven MarketScan data, 2004-2016
• Get the data • PNG

Among people with large employer coverage, this pattern (of increasing opioid prescription use through the late 2000s, followed by a drop-off through 2016) is similar across most major disease categories. Some of the steepest declines in opioid prescription use since 2009 were among people with complications from pregnancy or childbirth, musculoskeletal conditions, and injuries. The share of people experiencing complications from pregnancy or childbirth who received an opioid prescription peaked in 2007, when 35% received an opioid prescription, but this share dropped to 26% in 2016. Similarly, in 2007, 37% of people with large employer coverage who had a musculoskeletal condition received an opioid prescription, but the share dropped to 30% by 2016. The same decline can be seen among people with large employer coverage who experienced injuries and poisonings (37% in 2009, down to 30% in 2016).

Opioid use declined across disease categories, particularly pregnancy, musculoskeletal diseases, and injuries

---

Among enrollees in a large employer plan, share of people who received any opioid prescription, by diagnosis, 2004-2016

Source: Kaiser Family Foundation analysis of Truven MarketScan data, 2004-2016
• Get the data • PNG

Opioid prescription use among people with large employer coverage has declined across all major disease categories, including musculoskeletal conditions, injuries, and cancer

SHARE ON X

We also see a sharp decline in the use of opioid prescriptions among people with cancer diagnoses, particularly in the most recent couple of years. In 2016, 26% of people with large employer coverage who had a cancer diagnosis received at least one opioid prescription, down from 32% in 2007. Despite declines in opioid prescribing for musculoskeletal conditions, people with large employer coverage who

have musculoskeletal diagnoses still receive opioid medications more frequently (30%) than those with cancer diagnoses (26%).

Overall in 2016, among those receiving an opioid prescription, a slightly larger share received only a single prescription in that year (61%) than did in 2006, a decade earlier (58%). The average number of prescriptions each person received also rose from 2004 until 2010 and then fell again, but this measure is imperfect because it does not adjust for the length of the supply or the strength of the drug received.

In total, large employer plans and their enrollees spent $1.4 billion in 2016 on opioid prescription painkillers, down 27% from peak spending of $1.9 billion in 2009. In 2016, $263 million, or 19% of total opioid prescription drug spending was paid out-of-pocket by enrollees.

Spending on opioid prescriptions peaked in 2009

Total cost of opioid prescriptions among enrollees in a large employer plan, in millions, 2004-2016

Total Insurance Cost   Total Out-of-Pocket Cost

Source: Kaiser Family Foundation analysis of Truven MarketScan data, 2004-2016
• Get the data • PNG

Opioid prescriptions have represented a small share of total health spending by large employer plans and enrollees.

Treatment for Opioid Addiction & Overdose among People with Large Employer Coverage

In 2016, people with large employer coverage received $2.6 billion in services for treatment of opioid addiction and overdose, up from $0.3 billion in 2004. Of the $2.6 billion spent on treatment for opioid addiction and overdose in 2016 for people with large employer coverage, $1.3 billion was for outpatient treatment, $911 million was for inpatient care, and $435 million was for prescription drugs. In 2016, $2.3 billion in addiction and overdose services was covered by insurance and $335 million was paid out-of-pocket by patients. (This total only includes only payments for services covered at least in part by insurance, not services that are paid fully out-of-pocket and not billed to insurance, so it is likely an undercount of opioid addiction and overdose treatment expenses by this population.)

The cost of treating opioid addiction and overdose has risen even as opioid prescription use has fallen

Total amounts paid for opioid addiction and overdose treatment diagnoses for enrollees in large employer plans, in millions, 2004-2016

Source: Kaiser Family Foundation analysis of Truven MarketScan data, 2004-2016
• Get the data • PNG

The cost of treating opioid addiction & overdose for people with employer coverage jumped to $2.6 billion in 2016 from $0.3 b in 2004

SHARE ON X

Spending on treatment for opioid addiction and overdose represents a small but growing share of overall health spending by people with large employer coverage. In 2016, treatment for opioid addiction and overdose represented about 1% of total inpatient spending by people with large employer coverage and about 0.5% of total outpatient spending. In 2004, treatment for opioid addiction and overdose represented about 0.3% of total inpatient spending and less than 0.1% of total outpatient spending. On average, inpatient and outpatient treatment for opioid addiction and overdose added about $26 per person to the annual cost of health benefits coverage for large employers in 2016, up from about $3 in 2004.

The bulk of the total $2.6 billion in spending for treatment of opioid addiction and overdose among people with large employer coverage was treatment for young adults, totaling $1.6 billion in 2016, even though young adults are prescribed opioids less often than older adults. Males also used more treatment than women ($1.6 billion vs $1.0 billion).

Spending on opioid addiction and overdose treatment is mostly concentrated among younger people

Total amounts paid for opioid addiction and overdose diagnoses for enrollees in large employer plans, in millions, by age and sex, 2016

Total Insurance Cost   Total Out-of-Pocket Cost

Total cost values for 0-17: Total Insurance Cost ($37 million); Total OOP Cost ($3 million)

Source: Kaiser Family Foundation analysis of Truven MarketScan data, 2016
• Get the data • PNG

The bulk of spending by people with large employer coverage on inpatient and outpatient treatment for opioid addiction and overdose was for employees' children (53%) or spouses (18%), while just under a third (29%) was for employees themselves.

Among people with large employer coverage who had outpatient spending on treatment for opioid addiction and overdose, their average outpatient expenses totaled $4,695 (of which $670 was paid out-of-pocket) in 2016. Among those with inpatient spending on treatment for opioid misuse, their average inpatient expenses totaled $16,104 (with $1,628 paid out-of-pocket) in 2016. On average, inpatient expenses have risen sharply, up from $5,809 in 2004.

In 2016, 342 people per 100,000 large group enrollees received treatment for opioid overdose or addiction, including 67 people per 100,000 who received treatment in an inpatient setting.

Discussion

Among people with large employer coverage, utilization of opioid prescription painkillers has declined somewhat in recent years. Use of and spending on prescription opioids by this group peaked in 2009 and has since dropped to the lowest levels in over a decade. Across most major disease categories, we see a

similar pattern of the frequency of opioid prescription use rising until the late 2000s and then declining through 2016.

Despite declining rates of opioid prescribing to those with employer coverage, spending on treatment for opioid addiction and overdose has increased rapidly, potentially tied to growing illicit use and increased awareness of opioid addiction. Opioid addiction and overdose treatment – the bulk of which is for dependents of employees – represents a small but growing share of overall employer health spending.

Methods

We analyzed a sample of claims obtained from the Truven Health Analytics MarketScan Commercial Claims and Encounters Database (Marketscan). The database has claims provided by large employers (those with more than 1,000 employees); this analysis does not include opioid prescription or addiction treatment for other populations (such as the uninsured or those on Medicaid or Medicare). We used a subset of claims from the years 2004 through 2016. In 2016, there were claims for almost 20 million people representing about 23% of the 85 million people in the large group market. Weights were applied to match counts in the Current Population Survey for large group enrollees by sex, age, state and whether the enrollee was a policy holder or dependent. People 65 and over were excluded.

Over 14,000 national drug codes (NDC) were defined as opiates. In general, we defined "prescription opioids" as those with a primary purpose of treating pain. Only prescriptions classified under the controlled substance act are included. We excluded from this category Methadone, Suboxone (Buprenorphine with Naloxone), and other drugs commonly used to treat addiction. We also excluded medications not commonly prescribed (such as Pentazocine). Each opiate script was counted as a single prescription regardless of the quantity or strength of that prescription. The Marketscan database only includes retail prescriptions administered in an outpatient setting. Disease categories are defined by AHRQ's chronic condition indicators, and based on the diagnosis an enrollee receives.

In our analysis of opioid addiction and overdose treatment, we include medications used to treat overdose (e.g. Naloxone) and drugs used to treat addiction (e.g. Methadone and Suboxone). We also include inpatient and outpatient medical services to treat opioid addiction or overdose, identified by ICD-9 and ICD-10 diagnosis codes. Midway through 2015, Marketscan claims transitioned from ICD-9 to ICD-10. While both systems classify diagnoses, there is no precise crosswalk between the two. In consultation with a clinician, we selected both ICD-9 and ICD-10 codes which are overwhelmingly used for opioid addiction or signify misuse. A list of these ICD codes is available upon request. Because of the change in coding systems, it is not possible to tracks trends between 2014 and 2016. Diagnoses related to heroin abuse were included as opiate abuse.

Because there is no precise way to identify costs associated with opioid addiction and overdose treatment, some of our rules for inclusion lead to an underestimate, while others lead to an

overestimate. In general, we elected a conservative approach. For example, in some cases, opioid abuse diagnoses may be classified under a broader drug abuse diagnosis and therefore are not captured. Additionally, we do not include the costs associated with diagnoses that commonly arise from opioid abuse, such as respiratory distress or endocarditis, unless an opioid abuse diagnosis was also present. However, if a claim included an opioid abuse diagnosis along with other diagnoses, we included spending for all procedures during that day, even if some of those interventions were to treat concurrent medical conditions unrelated or indirectly related to opioid abuse. If an enrollee paid fully out-of-pocket and did not use their insurance coverage, this spending is also not included. Overall, we think these assumptions lead to an underestimate of the costs associated with opioid addiction and overdose treatment for the large employer coverage population.

About this site

The Peterson Center on Healthcare and KFF are partnering to monitor how well the U.S. healthcare system is performing in terms of quality and cost.

EXHIBIT 192

Health Crisis and Housing Market Effects - Evidence from the U.S. Opioid Epidemic

Walter D'Lima[1] [ID] · Mark Thibodeau[1]

Abstract

We present evidence on the effect of a public health crisis on housing markets through the lens of the recent opioid crisis in the U.S. Using data on opioid prescriptions and repeat sales in Ohio, we find that house price changes around opioid dispensaries are negatively associated with the quantity of opioids dispensed. To explore a causal inference, we use a potentially cleaner measure of supply that is based on vertical integration. We estimate that a one standard deviation increase in the standardized number of pills dispensed by vertically integrated pharmacies is associated with a 5.8% decrease in house price appreciation. Our work informs the broader policy discussion on economic costs resulting from health crises.

Keywords Health crisis · House prices · Opioid epidemic

JEL classification: R1 · R3

Introduction

We study the effect of a public health epidemic on the housing market through the lens of the recent opioid crisis in the U.S. Specifically, whether the opioid crisis, which refers to the overuse and misuse of prescription opioids, affects house prices.

✉ Walter D'Lima
  wdlima@fiu.edu

  Mark Thibodeau
  mthibodeau@fiu.edu

1 Hollo School of Real Estate, Florida International University, 1101 Brickell Avenue, Miami, FL 33131, USA

The rise in usage of prescription opioids from the late 1990s culminated in the U.S. Department of Health and Human Services declaring a public health emergency. In this study, we conjecture that house price changes around opioid dispensaries are negatively associated with the quantity of opioids dispensed and present related empirical evidence.

We use a novel dataset of opioid prescriptions in Ohio. Detailed prescription data is typically not available to the public; however, an order from a lawsuit filed by the Washington Post in a federal court in Ohio resulted in a limited release of prescription opioid data. We exploit spatial and temporal variations in micro-level opioid prescription data to identify its relation with house prices. Our main empirical results comprises of a repeat sales framework to account for static characteristics that are fixed over time. We consider different standardized measures for opioid dispense and use near to a property, i.e. within 2-miles of a property. The first two standardized measures are based on the dispense within 2-miles of a repeat sale property, i.e. number of pills per pharmacy and the number of pills per property. We find a significant, negative association between the number of pills dispensed and the returns for nearby properties. However, the results based on these measures limit causal inferences. Hence, we consider variation in opioid dispensary type to develop a cleaner measure of supply. Pharmacies that receive almost all of their opioids (for subsequent dispense) from their parent company that also serve as a distributor have a vertically integrated supply chain. Distributors have a responsibility to report suspicious orders. However, vertical integration may skew monitoring incentives. Our next two standardized measures are based on the dispense by distributor-pharmacies. We show that our results persist for dispense measures based only on such distributor-pharmacies that may involve ease of flow in the supply chain. The results based on dispense measures by vertically integrated pharmacies may potentially imply a causal narrative on supply side factors having a negative effect on house prices. A one standard deviation increase in the standardized number of pills by distributor-pharmacies is associated with a 5.8% decrease in house price appreciation.

We highlight the robustness of our results through additional tests. First, we account for dispensary openings and closings. Second, we examine a subset of transactions in higher dispense opioid areas to mitigate an alternate explanation that differences between "opioid areas" and non-opioid areas may be driving the results. Third, we account for outliers in terms of opioid dispense. Fourth, we address concerns that our results may be driven by factors related to the financial crisis since our study period overlaps the Great Recession. Our overall inference remains unchanged through either robustness check.

Furthermore, we assuage concerns that vertically integrated pharmacies may endogenously locate in areas with a higher demand for opioids. We identify a relatively more homogeneous subset of transactions in terms of the location choice, i.e. involving dispense by vertically integrated pharmacies and re-do the analysis. In addition, we account for the concern that vertically integrated pharmacies may endogenously locate in areas with a higher demand for opioids in another way by controlling for a measure of demand for opioids in the area, i.e. dispense by dispensaries that are not vertically integrated. Either way, our overall inference remains unchanged.

Our work lies at the intersection of several lines of inquiry. We contribute to the growing literature that studies public health factors and its effect on housing markets. For instance, Tyndall (2019) exploits variation generated by the opening and closing dates of marijuana dispensaries in Vancouver, Canada and studies externalities in the housing market. The author infers that such dispensaries impose a negative price effect on nearby homes. Wong (2008) investigates the effect of the 2003 Hong Kong Severe Acute Respiratory Syndrome (SARS) epidemic on housing markets and finds that prices declined by 1%-3% for affected housing complexes. More recently, Francke and Korevaar (2020) study the effect of pandemics on housing markets by examining the outbreak of plague in 17th-century Amsterdam and cholera in 19th-century Paris. The authors find a short-term, negative price effect on housing markets. The recent Coronavirus disease (COVID-19) epidemic too is sparking interest. Ling et al. (2020) document a negative relation between COVID-19 exposure and commercial real estate prices. D'Lima et al. (2020) examine the effect of COVID-19 shutdown orders on the housing market and find heterogeneous pricing effects. In line with these studies, our goal is to identify the implicit price discount related to opioid usage and the negative symptoms of drug abuse. We consider opioid dispensing locations as a locus of supply for neighborhoods, and test for a relation between opioid dispense and house prices.

Closest to our work is a study by Custodio et al. (2021). The authors study the relation between opioid abuse and real estate prices by examining the passage of state laws that are intended to limit opioid abuse. We contribute to the literature by highlighting the relation between opioid dispense and real estate prices through micro-level evidence and by examining dispense measures by vertically integrated pharmacies that may potentially imply a causal narrative on supply side factors having a negative effect on house prices. In addition, we inform the broader policy discussion on expending resources to mitigate health crises by quantifying costs that arise beyond direct health related effects. The remainder of this paper proceeds as follows. The next section presents an overview of the opioid crisis and develops the hypothesis, followed by a description of the data in Section 3. Section 4 presents the empirical methodology and results. Finally, we conclude with a discussion on the implications of our findings in Section 5.

Background & Hypotheses Development

The rapid expansion in the prescription and consumption of opioids may be attributed to supply-side factors. For instance, the manufacturing and marketing of opioids as well as shifting attitudes of physicians have attracted the most discussion. Starting in the 1990s, pain was declared the "5th vital sign" by the American Pain Society. Purdue Pharma introduced OxyContin in 1996, which was marketed aggressively and went from $48 million in revenue to $1.1 billion in 2000 (Evans et al. (2019)). The result, over this period, was rapid surges in the prescribed population, the number of prescriptions per person, and the dosage size of each prescription.

Kenan et al. (2012) note a 35.2% increase in opioid prescriptions per 100 persons and a 69.7% increase in dosage size between 2000 and 2010 across the U.S. This increase in the supply and usage of prescription opioids is positively associated with increased dependence and addiction. For example, Edlund et al. (2014) find that patients with a chronic non-cancer pain condition who were prescribed opioids had significantly higher rates of opioid use disorders than those who were not prescribed opioids.

There are several adverse health, social and economic outcomes from opioid misuse that provide a basis for hypothesizing an effect on house prices. There may be first-order effects such as illegal drug use and criminal activity that may arise from opioid misuse.[1] Such first-order effects are a dis-amenity that will dampen property price appreciation. In addition, there may be second-order effects due to broader implications for the local economy. For example, Case and Deaton (2020) characterize opioids deaths as a "death of despair" and note that opioid addictions have an impact on individuals' social and labor market outcomes. In general, economic activity is depressed in areas near to the focal point of drug usage.[2] The cumulative impact of the first-and second-order effects will result in a decrease in demand and buyers potentially bidding lower prices. Thus, we conjecture that demand side effects on the real estate market resulting from opioid dispense may result in observing a negative association between opioid dispense and house price appreciation.

On the other hand there may be supply side effects. Opioid addiction among homeowners may result in outcomes such as death or financial instability that affects the ability to make mortgage payments. For instance, Elul et al. (2010) find that borrower illiquidity is associated with mortgage default. Such outcomes could result in an increase in supply as properties are listed for sale. The resultant increase in supply of properties on the market may result in lower bid prices. Hence, we conjecture that such supply side effects resulting from opioid dispense may result in observing a negative association between opioid dispense and house price appreciation.

Lastly, to assume a local real estate market effect around opioid dispensaries, the use and abuse of opioids need to be local. We rely on prior work by Cepeda et al. (2013) who find very little opioid shopping or traveling to obtain and fill opioid prescriptions by tracking the distance subjects travel between the pharmacies where their opioid prescriptions are filled. With data on over 10 million subjects in the United States with at least three opioid prescriptions in 2008 and followed for 18 months, Cepeda et al. (2013) classifies shoppers as those that

---

[1] According to the National Institute of Health (NIH), more than 130 people die in the U.S. every day from opioid-related overdose. Drug overdose is now the leading cause of accidental death in the United States, and 80% of individuals that are addicted to heroin were first prescribed opioids for pain relief. See Addiction Center (2020), National Institutes of Health (2020a) and National Institutes of Health (2020b) for further details.

[2] For example, Florence et al. (2016) use data on health care claims and fatality cases to estimate the cost of the opioid crisis. The authors estimate that the cost of prescription opioid overdose, abuse and dependence in the U.S. was $78.5 billion in 2013.

fill overlapping prescriptions, have more than one prescriber and go to more than two pharmacies. Nearly all (99.3%) of over 10 million subjects were classified as non-shoppers, shopping at only one pharmacy. The study finds that the median distance traveled by non-shoppers was approximately 0 miles. Hence, we conjecture that opioid dispense may be negatively associated with local house price appreciation.

Data

Our analysis is based on data of opioid supply, housing transactions, mapping the distance of one to the other, and assuming proximity matters. This section presents an overview of the opioid and property transaction data.

Opioid Prescription Data

The Controlled Substances Act of 1970 mandates reporting transactions of certain controlled substances to the Drug Enforcement Administration (DEA). A record of each transaction includes the name of the drug, the quantity, the active ingredient (such as Hydrocodone bitartrate hemipentahydrate), and receiver details ("opioid dispensary", i.e., a pharmacy or practitioner that receives the drugs and then presumably dispenses). This information is stored in the Automation of Reports and Consolidated Orders System (ARCOS) so the DEA can monitor the distribution and sale of highly addictive drugs. While summary data from ARCOS is available, micro-level transaction data is restricted.

In 2019, a federal judge in Ohio working on a case filed by the Washington Post and HD Media ordered the DEA to release a limited set of opioid transaction information. Since the ruling, the Washington Post secured and made the ARCOS data accessible to the public.[3] The data provided by the Washington Post gives the time-series of pills of Oxycodone and Hydrocodone received by pharmacies and practitioners.[4] These two opioids are the most commonly prescribed and represent over 75% of the opioid-market during this time-period. To get a perspective on the potential effects of Oxycodone and Hydrocodone, a comparison with a commonly known pain relieving drug can be drawn. Typically, in medical parlance, analgesic strength of painkillers is measured as a comparison to morphine. Oxycodone is considered 1.5 times as strong as morphine. Hydrocodone is equal in strength to morphine. In contrast, a single dose of Tylenol/aspirin is about 360 times weaker than a dose of morphine.[5]

---

[3] See Washington Post (2019b) for additional details on the data.

[4] The Washington Post notes the following regarding the data field: "DEA calculated field indicating number of pills, patches or lozenges, among others, shipped as part of the transaction."

[5] Drug Rehab (2020) notes additional information on drug potency.

Table 1 NAICS Health Care and Social Assistance: Ohio vs. Non-Ohio States

Health Care and Social Assistance	Ohio		Avg. Non-Ohio States	
	2006	2012	2006	2012
Panel A. State Total Numbers and Amounts				
Total Mid-March Employees	730,349	809,204	314,420	351,383
Total First Quarter Payroll ($1,000)	6,052,107	8,115,338	2,809,883	3,731,365
Number of Establishments	27,212	28,307	14,705	16,112
Q1 Payroll per Mid-March Empl. ($1,000)	8.29	10.03	8.71	10.37
Panel B. Within State Percentage Across All 2-digit NAICS Classifications				
Pct. of State Establishments (%)	10.08	11.28	9.82	10.95
Pct. of State's Mid-March Employees (%)	15.14	17.79	14.37	16.36
Pct. of State's First Quarter Payroll (%)	13.85	17.21	13.85	15.88

This table presents health care and social assistance employment and payroll information data. The data is based on the 2-digit North American Industry Classification System (NAICS) code (62) and is provided by County Business Patterns (CBP). Panel A displays state-level health care and social assistance employment and payroll statistics for Ohio and Non-Ohio states in 2006 and 2012. Panel B reports the employment and payroll statistics for health care and social assistance as a percentage of state-level totals

Our study uses data for Ohio from 2006 to 2012, which is a state that was the focus of the lawsuit and has been hit particularly hard by the opioid crisis.[6] In Table 1, we compare the economic activity in health care and social assistance for Ohio and non-Ohio states by examining industry-level employment and payroll statistics. The data is obtained from County Business Patterns (CBP) and is categorized by the North American Industry Classification System (NAICS). Panel A summarizes the number of employees, establishments, and payroll amount categorized by the 2-digit NAICS code of 62, specifically, for healthcare and social assistance between Ohio and non-Ohio states for 2006 and 2012. By the numbers, Ohio is larger than the average state. Panel B displays the economic activity in healthcare proportionally to state NAICS totals, and depicts that as a percentage health related employment, establishments, and payroll is comparable with non-Ohio states in 2006 and 2012.

Table 2 reports the average percentage change in median house prices (based on Zillow data) for the top and bottom Ohio zip-codes by the total number of pills dispensed over the study period of 2006 to 2012. Panel A shows the average house price changes from the earliest period available from Zillow (April 1994) through December 2005 for the top-10% and top-20% of zip codes with the most total pills compared to the bottom-10% and bottom-20%, respectively. In the pre-study period there is no discernible difference in median house price appreciation rates between the top and bottom groups. Panel B shows the average house price changes from January 2006 through December 2012. Between the top and bottom-10% there is an absolute difference of 9.8%, which is marginally lower at 7.6% between the top and bottom-20% of zip codes. The evidence suggest parallel trends in prices up to the start of the study period in 2006 that involves the rise of prescription opioids.

---

[6] See National Institutes of Health (2020c) for a complete list.

Table 2 House price changes by Ohio zip codes sorted by total pills dispensed during the 2006 to 2012 period

Ohio Zip Codes by	Total Pills 2006-2012	
	Top	Bottom
Panel A. 1994-2005		
10% Zip Codes	42.3	41.3
20% Zip Codes	41.4	43.3
Panel B. 2006-2012		
10% Zip Codes	-19.0	-9.2
20% Zip Codes	-18.1	-10.5

This table presents the average percentage change in median house prices (based on Zillow monthly zip code level data) for a subset of zip codes sorted by the total number of pills from 2006 to 2012. Panel A reports the average house price changes from the earliest available period (April 1994) through December 2005 for zip codes with the highest and lowest number of total pills from 2006 to 2012 (top-10%, top-20%, bottom-10%, and bottom-20%). Similarly, Panel B reports the average house price change from January 2006 through December 2012. Since the zip codes in Panel A and Panel B are both sorted on total pills from 2006 to 2012, the top-10% of zip codes are the same set of zip codes in Panel B as in Panel A. Similarly, the top-20%, bottom-10%, and bottom-20% have the same set of zip-codes

Property-Level Data

We obtain property-level data from Zillow, which collects transaction level information from county tax assessor and recorders' offices. We use property transaction data, such as sales dates and prices, as well as the transacted property's address and geographic coordinates. Our sample comprises of properties that transact more than once between 2006 and 2012, i.e. 71,009 repeat sales observations.[7]

Summary Statistics

Table 3 presents the summary statistics of the data. Our sample comprises of residential properties and land transactions. The mean number of bedrooms is around 3. Properties are held for an average of 1.9 years and there is substantial variation in the holding period length as indicated by the 1st and 99th percentiles. The mean purchase price is $97,583, and the mean sale price is $109,391.

In addition to detailed information on pill shipments to dispensaries, the Washington Post data also includes the exact physical addresses. We geocode the dispense addresses and generate variables that measure the dispense of opioid drugs and map

---

[7] We implement some data cleaning rules. For instance, we trim the sample at the top and bottom percentiles of transaction price and change in price to account for outlying observations that may skew the results.

Table 3 Summary Statistics

	N	Mean	P1	Median	P99	SD
Purchase Price (PP)	71,009	97,582.71	6,000.00	72,500.00	421600.00	83,939.90
Sale Price (SP)	71,009	109,391.40	3,000.00	79,900.00	461,700.00	100,367.96
ln(SP/PP)	71,009	-0.02	-2.18	-0.05	1.98	0.83
Bedrooms	71,009	2.87	0.00	3.00	5.00	1.05
Holding Period (days)	71,009	683.84	93.00	407.00	2,282.00	613.46
#Pills/#Pharmacies (in 10,000s)	71,009	26.28	0.00	11.29	162.54	38.12
#Pills/#Properties (in 1,000s)	71,009	0.19	0.00	0.07	1.39	0.32
#Pills/#Pharmacies (Distributor, in 10,000s)	71,009	4.23	0.00	0.00	43.53	9.34
#Pills/#Properties (Distributor, in 1,000s)	71,009	0.03	0.00	0.00	0.31	0.07
#Pharmacies	71,009	6.70	0.00	6.00	23.00	5.87
#Properties	71,009	10,260.07	281.00	8,628.00	31,907.00	8,016.60
#Pills/#Pharmacies per year (in 10,000s)	71,009	14.15	0.00	13.31	49.31	11.92
#Pills/#Properties per year (in 1,000s)	71,009	0.10	0.00	0.09	0.43	0.10
#Pills/#Pharmacies per year (Distributor, in 10,000s)	71,009	2.37	0.00	0.00	14.55	3.45
#Pills/#Properties per year (Distributor, in 1,000s)	71,009	0.02	0.00	0.00	0.10	0.02
Δ Median Income	71,009	0.01	-0.10	0.00	0.13	0.05
Δ Unemployment Rate	71,009	0.24	-0.29	0.09	1.21	0.37
Δ Dispensaries	71,009	0.07	-3.00	0.00	4.00	1.22

This table presents summary statistics on several variables for the sample of repeat sales properties. #Pills is the number of pills received by opioid dispensaries within 2-miles of a repeat sales property and within the repeat sales dates. #Pharmacies and #Properties are the number of pharmacies and properties within 2-miles of a repeat sales property. #Pills/#Pharmacies and #Pills/#Properties are the standardized measures of pills dispensed by all dispensaries. #Pills/#Pharmacies (Distributor) and #Pills/#Properties (Distributor) are the standardized measures of pills dispensed by distributor-pharmacies. Δ Median Income is the percentage change in median household income in the county where the property is located and between the repeat sales' years. Δ Unemployment Rate is the percentage change in the unemployment rate in the county where the property is located and between the repeat sales' years. Δ Dispensaries is the change in the number of dispensaries in the zip-code where the property is located and between the repeat sales' year-quarters

that supply to nearby properties. Since the density of opioid dispensaries varies, we generate two variables to proxy for the number of potential consumers in proximity to a repeat sales property. First, we compute the number of pharmacies within 2-miles of each repeat sales property. Note that pharmacies may be retail or chain. The mean number of pharmacies within 2-miles of each property is 7, and the standard deviation is 6. Second, we compute the number of properties within 2-miles of each repeat sales property. The mean number of properties near a repeat sales property is 10,260. There is considerable variation in the density of properties, as seen in the 1st and 99th percentiles (281 and 31,907 properties, respectively). Thus, the properties span rural and urban areas.

We also present the summary statistics for the number of pills standardized by the number of pharmacies and properties. To enable interpretation, we consider the means for the variables scaled by the length of the holding period. The mean annual number of pills per nearby pharmacy is around 141,500, and the mean annual number of pills per nearby property is 100.

Empirical Results

Repeat Sales Methodology

We use a repeat sales method to test for the relation between opioids dispensed and house price growth. The repeat sales method, first proposed by Bailey et al. (1963) and developed by Case and Shiller (1989) among others, is a common approach in the literature to control for time-invariant heterogeneity in housing markets. Consider transacted properties with purchase prices ($PP_{it\_}$) and sales prices (SP_{it}) that are a function of characteristics (X) and implicit prices (β). If we assume that characteristics are unchanged over transaction pairs with constant implicit prices, then the log of the price ratio, which differences out X and β, identifies the quality-adjusted change in house prices. In our base specification, the log return of transaction-pairs, defined as the log sales price over purchase price, $log(SP_{it}/PP_{it\_})$ is regressed on different measures of opioids dispensed.

Baseline Results

The repeat sales method helps circumvent the addition of a long list of controls that do not change between the purchase and sale dates. We use the following specification:

$$log(SP_{it}/PP_{it\_}) = \alpha + \beta \#Opioids_{it\_t} + \epsilon_{it\_t} \tag{1}$$

Here, $PP_{it\_}$ is the purchase price, and SP_{it} is the sale price in the repeat sale. $\#Opioids_{it\_t}$ is one of the following: 1. number of pills divided by the number of nearby pharmacies, or 2. number of pills divided by the number of nearby properties. Both measures are based on a 2-mile radius from a repeat sales property and measure the number of pills for dispense received by dispensaries between the purchase and sale dates.

Table 4 Regression results relating number of pills and house price changes

	(1)	(2)	(3)	(4)
#Pills/#Pharmacies (in 10,000s)	-0.0018***			
	(0.0004)			
#Pills/#Properties (in 1,000s)		-0.1073***		
		(0.0247)		
#Pills/#Pharmacies (Distributor, in 10,000s)			-0.0062***	
			(0.0010)	
#Pills/#Properties (Distributor, in 1,000s)				-0.6257***
				(0.1263)
Constant	0.0232	-0.0041	0.0015	-0.0063
	(0.0164)	(0.0145)	(0.0128)	(0.0132)
Adjusted-R^2	0.19	0.19	0.19	0.19
N	71,009	71,009	71,009	71,009

This table presents regression results that are based on repeat sales that have purchase and sale dates between the 2006 to 2012 time-frame. The dependent variable is ln(SP/PP). #Pills/#Pharmacies and #Pills/#Properties are the standardized measures of pills dispensed by all dispensaries. #Pills/#Pharmacies (Distributor) and #Pills/#Properties (Distributor) are the standardized measures of pills dispensed by distributor-pharmacies. A three-way interaction fixed effect for purchase-year-quarter, sale-year-quarter, and the county code is included in each regression. Robust standard errors are noted in parentheses. *, ** and *** depict significance at the 10%, 5%, and 1% level, respectively

Table 4 presents the estimated repeat sales regression results based on the two separate explanatory variables of interest.[8] We include a three-way interaction for purchase-year-quarter, sale-year-quarter, and the county code fixed effects to account for area-specific trends. The three-way interaction specification accounts for general house price changes over time and heterogeneous areas. Columns 1 and 2 present the regression results involving the number of pills per pharmacy and the number of pills per property as explanatory variables respectively. The coefficient of *#Pills/#Pharmacies* in Column 1 is -0.0018 and statistically significant at the 1% level. This implies a 6.9% decline in house price growth relating to a one standard deviation increase in the standardized measure of pills dispensed, i.e. *#Pills/#Pharmacies*.[9] The coefficient of *#Pills/#Properties* in Column 2 is -0.1073 and statistically significant at the 1% level. This implies a 3.4% decline relating to a one standard deviation increase in the *#Pills/#Properties*. Thus, the relation between house price appreciation and opioid dispense appears to be economically meaningful.

We also use variation in the ease of distribution across areas as a cleaner measure of supply to potentially present a causal narrative. Typically, opioid dispensaries receive drugs from distributors. Some pharmacies were in a unique position as it was its own distributor, and its internal distribution centers handled almost all of the pills. The Washington Post notes that "about 2,400 cities and counties nationwide

---

[8] The standard errors are clustered at the zip-code level.
[9] The standard deviations are noted in Table 3.

allege that Walgreens failed to report signs of diversion and incentivized pharmacists with bonuses to fill more prescriptions of highly addictive opioids." Further details are noted in Washington Post (2019a). We classify Walgreens' pharmacies as distributor-pharmacies. Distributors have a responsibility to report suspicious orders made by dispensaries. Monitoring incentives may be mis-aligned when distributors and pharmacies are vertically integrated, and one may conjecture a reduction in frictions in the supply chain. We generate a measure of opioids dispensed only through such distributor-pharmacies and re-do the analyses. Columns 3 and 4 present the regression results with *#Pills/#Pharmacies* and *#Pills/#Properties* as explanatory variables and these measures are based on the dispense only by pharmacies that have a vertically integrated supply chain. We see that the coefficient of both the standardized measures of pills dispensed is negative and statistically significant. This implies a 5.8% and 4.4% decline in house price growth relating to a one standard deviation increase in the standardized measure of pills dispensed, i.e. *#Pills/#Pharmacies* and *#Pills/#Properties* measuring the standardized number of pills dispensed by distributor-pharmacies. Thus, our results persist for measures based on pharmacies that may have less frictions to supply opioids. While the results based on the dispense by all the dispensaries depict an association, the results based on dispense measures by vertically integrated pharmacies are suggestive of a causal narrative on supply side factors negatively affecting property price appreciation.[10]

Accounting for the Great Recession

Our study period overlaps the Great Recession. To alleviate concerns that our results may be driven by factors related to the financial crisis, we control for the percentage change in median household income and the unemployment rate. We obtain county level data, re-do the analyses and report the results in Table 5. The median household income and unemployment data is defined annually at the county level for each year of our sample period.[11] Note that we include a two-way interaction for purchase-year-quarter and sale-year-quarter to account for area-specific trends

---

[10] We perform several robustness checks and include the results in the Appendix. We use the opioid data over the entire study period and count the number of pharmacies within 2-miles of a repeat sales property to generate a standardized measure of the number of pills dispensed. There may be concerns relating to endogenous opening or closing of dispensaries influencing the results. Table 9 presents regression results based on a subset of transactions that did not involve any openings or closings. We note a similar inference as before. There may be considerable differences in areas that dispense opioids relative to those that do not. We repeat our analysis for the sample of repeat sales in high volume opioid areas, i.e., areas above the 25th-percentile of dispense (The main results involve repeat sales across all areas). Table 10 presents the regression results and we see that the overall inference remains unchanged. Lastly, we account for outliers due to either a very high or low amount of dispense by dispensaries or in specific areas by re-doing the analysis for a subset of repeat sale transactions that involve dispense between the top and bottom percentile of the distribution of dispense. The results are presented in Table 11 and the inference is robust to the exclusion of potential outliers.

[11] The U.S. Census Bureau's Small Area Income and Poverty Estimates program produces single-year estimates of income and poverty for all U.S. states and counties as well as estimates of school-age children in poverty for all 13,000+ school districts. The Local Area Unemployment Statistics (LAUS) program produces monthly and annual employment, unemployment, and labor force data for Census regions and divisions, states, counties, metropolitan areas, and many cities, by place of residence.

Table 5 Regression results relating number of pills and house price changes - Controlling for change in income and unemployment

	(1)	(2)	(3)	(4)
#Pills/#Pharmacies (in 10,000s)	-0.0016***			
	(0.0002)			
#Pills/#Properties (in 1,000s)		-0.0816***		
		(0.0199)		
#Pills/#Pharmacies (Distributor, in 10,000s)			-0.0068***	
			(0.0010)	
#Pills/#Properties (Distributor, in 1,000s)				-0.6746***
				(0.1101)
Δ Median Income	0.9933***	1.0150***	0.9338***	0.9726***
	(0.1952)	(0.1987)	(0.1908)	(0.1970)
Δ Unemployment Rate	0.1797***	0.1915***	0.1685***	0.1809***
	(0.0632)	(0.0623)	(0.0604)	(0.0618)
Constant	-0.0336	-0.0645**	-0.0451	-0.0574*
	(0.0327)	(0.0328)	(0.0292)	(0.0307)
Adjusted-R^2	0.07	0.07	0.07	0.07
N	71,009	71,009	71,009	71,009

This table presents regression results that are based on repeat sales that have purchase and sale dates between the 2006 to 2012 time-frame. The dependent variable is ln(SP/PP). #Pills/#Pharmacies and #Pills/#Properties are the standardized measures of pills dispensed by all dispensaries. #Pills/#Pharmacies (Distributor) and #Pills/#Properties (Distributor) are the standardized measures of pills dispensed by distributor-pharmacies. Δ Median Income is the percentage change in median household income in the county where the property is located and between the repeat sales' years. Δ Unemployment Rate is the percentage change in the unemployment rate in the county where the property is located and between the repeat sales' years. A two-way interaction fixed effect for purchase-year-quarter and sale-year-quarter is included in each regression. Robust standard errors are noted in parentheses. *, ** and *** depict significance at the 10%, 5%, and 1% level, respectively

instead of a three-way interaction that includes the county code as including the three-way interaction will result in the income and unemployment variables being dropped from the model since the data is at the county-year level. As in the main specification in Table 4, the coefficients of the variables of interest are negative and statistically significant.

As a further robustness check, we split the data into a pre-2008 and post-2008 period and re-do the analyses. Panel A of Table 6 presents the regression results based on repeat sales that have a purchase and sale date that occurred until 2008. Panel B presents the results based on repeat sales that have a purchase and sale date that occurred after 2008. We note that our findings are robust to data subsets from different time periods.

Endogenous Self-Selection by Distributor-Pharmacies

We account for concerns that vertically integrated pharmacies may endogenously locate in areas with a higher demand for opioids and hence one may empirically

Table 6 Regression results relating number of pills and house price changes - Across time periods

	(1)	(2)	(3)	(4)
Panel A: Purchase and sale dates until 2008				
#Pills/#Pharmacies (in 10,000s)	-0.0061***			
	(0.0013)			
#Pills/#Properties (in 1,000s)		-0.3806***		
		(0.1337)		
#Pills/#Pharmacies (Distributor, in 10,000s)			-0.0233***	
			(0.0043)	
#Pills/#Properties (Distributor, in 1,000s)				-2.8815***
				(0.6477)
Constant	0.1338***	0.0975***	0.1116***	0.1024***
	(0.0241)	(0.0230)	(0.0200)	(0.0210)
Adjusted-R^2	0.27	0.27	0.27	0.27
N	23,637	23,637	23,637	23,637
Panel B: Purchase and sale dates after 2008				
#Pills/#Pharmacies (in 10,000s)	-0.0032***			
	(0.0010)			
#Pills/#Properties (in 1,000s)		-0.2577***		
		(0.0890)		
#Pills/#Pharmacies (Distributor, in 10,000s)			-0.0122***	
			(0.0037)	
#Pills/#Properties (Distributor, in 1,000s)				-1.4736***
				(0.5428)
Constant	0.1278***	0.1091***	0.1117***	0.1072***
	(0.0223)	(0.0199)	(0.0179)	(0.0188)
Adjusted-R^2	0.10	0.10	0.10	0.10
N	19,853	19,853	19,853	19,853

This table presents regression results that are based on repeat sales. Panel A presents the results based on repeat sales that have a purchase and sale date that occurred until 2008. Panel B presents the results based on repeat sales that have a purchase and sale date that occurred after 2008. The dependent variable is ln(SP/PP). #Pills/#Pharmacies and #Pills/#Properties are the standardized measures of pills dispensed by all dispensaries. #Pills/#Pharmacies (Distributor) and #Pills/#Properties (Distributor) are the standardized measures of pills dispensed by distributor-pharmacies. A three-way interaction fixed effect for purchase-year-quarter, sale-year-quarter, and the county code is included in each regression. Robust standard errors are noted in parentheses. *, ** and *** depict significance at the 10%, 5%, and 1% level, respectively

observe a negative relation between dispense and house price growth. We identify a subset of transactions that have non-zero dispense for such pharmacies. These transactions involve dispense by vertically integrated pharmacies and are relatively more homogeneous in terms of the location choice, i.e. involve areas where vertically integrated pharmacies were present. Table 7 presents the regression results that is based on the subset of transactions and dispense through such distributor-pharmacies as explanatory variables. Columns 1 and 2 present the regression results for the standardized measures, *#Pills/#Pharmacies* and *#Pills/#Properties*, that are

Table 7 Regression results relating number of pills and house price changes - Distributor areas

	(1)	(2)
#Pills/#Pharmacies (Distributor, in 10,000s)	-0.0052***	
	(0.0011)	
#Pills/#Properties (Distributor, in 1,000s)		-0.3936***
		(0.1348)
Constant	-0.1070***	-0.1281***
	(0.0177)	(0.0194)
Adjusted-R^2	0.18	0.18
N	35,304	35,304

This table presents the regression results that are based on the subset of repeat sales that involve non-zero dispense by distributor-pharmacies. The dependent variable is ln(SP/PP). #Pills/#Pharmacies (Distributor) and #Pills/#Properties (Distributor) are the standardized measures of pills dispensed by distributor-pharmacies. A three-way interaction fixed effect for purchase-year-quarter, sale-year-quarter, and the county code is included in each regression. Robust standard errors are noted in parentheses. *, ** and *** depict significance at the 10%, 5%, and 1% level, respectively

based on dispense only by distributor-pharmacies. We see that the coefficients of the standardized measures are negative and statistically significant. Thus, even in a sample that only includes transactions where vertically integrated pharmacies dispensed (or located), we draw a similar inference.

Next, we account for the concern that vertically integrated pharmacies may endogenously locate in areas with a higher demand for opioids in another way by controlling for the dispense by non-distributor-dispensaries. Table 8 presents the regression results that includes *#Pills/#Pharmacies* and *#Pills/#Properties* that are based on dispense through such distributor-pharmacies and non-distributor-dispensaries as explanatory variables. The variables relating to non-distributor-dispensaries involve dispense by dispensaries that are not vertically integrated and may proxy for the demand for opioids in the area. We note that after controlling for non-distributor-dispensaries, the coefficients of *#Pills/#Pharmacies* and *#Pills/#Properties* that are based on dispense by distributor-pharmacies are negative and statistically significant. This implies that even after potentially controlling for the general demand for opioids in the area, the effect of dispense by vertically integrated pharmacies on house price growth persists.

Discussion & Concluding Remarks

Recent developments include a range of lawsuits alleging wrongdoing on the part of companies that either manufacture or distribute opioids. For instance, the Washington Post notes that two dozen companies are being sued by 2,000 towns and cities in

Table 8 Regression results relating number of pills and house price changes - Controlling for non-distributor dispenses

	(1)	(2)
#Pills/#Pharmacies (Distributor, in 10,000s)	-0.0057***	
	(0.0010)	
#Pills/#Pharmacies (Non-Distributor, in 10,000s)	-0.0000***	
	(0.0000)	
#Pills/#Properties (Distributor, in 1,000s)		-0.5749***
		(0.1342)
#Pills/#Properties (Non-Distributor, in 1,000s)		-0.0000*
		(0.0000)
Constant	0.0274*	-0.0012
	(0.0161)	(0.0144)
Adjusted-R^2	0.19	0.19
N	71,009	71,009

This table presents regression results that are based on repeat sales that have purchase and sale dates between the 2006 to 2012 time-frame and includes #Pills/#Pharmacies and #Pills/#Properties that are based on dispenses through distributor-pharmacies and non-distributor-dispensaries as explanatory variables. The dependent variable is ln(SP/PP). #Pills/#Pharmacies (Distributor) and #Pills/#Properties (Distributor) are the standardized measures of pills dispensed by distributor-pharmacies. #Pills/#Pharmacies (Non-Distributor) and #Pills/#Properties (Non-Distributor) are the standardized measures of pills dispensed by non-distributor-dispensaries. Three-way interaction fixed effect for purchase-year-quarter, sale-year-quarter, and the county code is included in each regression. Robust standard errors are noted in parentheses. *, ** and *** depict significance at the 10%, 5%, and 1% level, respectively

a federal court in Cleveland.[12] The companies defend their practices and argue that pharmacies, practitioners, and customers are to blame. While such discussions focus on healthcare and policy concerns relating to the opioid crisis, our study presents evidence of opioid-related effects on the housing market. We find a significant, negative association between opioid dispense and house price appreciation. To potentially present a causal narrative that may suggest externalities, we use a measure of supply that is based on vertical integration in the supply chain. Our findings imply that a one standard deviation increase in the standardized number of pills dispensed by vertically integrated pharmacies is associated with a 5.8% decrease in house price appreciation. Our results are robust to a range of alternate explanations.

There may be demand side effects. For instance, prescription opioids may lead to other drug addictions.[13] Part of the explanation underlying our findings may be attributed to a direct effect wherein addicts potentially impose a negative externality on nearby property prices. Furthermore, there may be indirect effects from opioids on house prices due to depressed economic activity and wealth shocks.

---

[12] Washington Post (2019c) notes further details.

[13] See Addiction Center (2020) for an additional discussion on opioid consumption leading to other drug addictions.

Thus, there may be a decrease in demand for housing in affected areas and hence a decline in house prices. On the other hand, opioid addiction may result in death or mortgage default from financial instability. Such outcomes may result in an increase in the supply of properties on the market and a decrease in prices that are bid. However, we leave identification of the exact underlying channel for future research.

The policy discussion on health crises has focused predominantly on direct consequences such as loss of wages, overdose deaths, etc. We show that an indirect effect arises on nearby assets, namely properties located near to focal points of an epidemic. We estimate a significant decline in the price appreciation rate of properties in affected areas. Thus, we inform the policy debate on the impact of health crises by quantifying an economic effect of the opioid epidemic. This may be more relevant in contemporaneous times as economic costs and responses to another health epidemic, COVID-19, is debated. While our work focuses on the opioid crisis, a general inference on epidemics and real estate markets may be drawn.

Appendix A Additional Tables

Table 9 Regression results relating number of pills and house price changes - Areas that did not have a change in the number of dispensaries

	(1)	(2)	(3)	(4)
#Pills/#Pharmacies (in 10,000s)	-0.0031**			
	(0.0012)			
#Pills/#Properties (in 1,000s)		-0.2257		
		(0.2254)		
#Pills/#Pharmacies (Distributor, in 10,000s)			-0.0105***	
			(0.0031)	
#Pills/#Properties (Distributor, in 1,000s)				-2.1057***
				(0.5322)
Constant	-0.0641**	-0.0933***	-0.0857***	-0.0904***
	(0.0258)	(0.0240)	(0.0180)	(0.0164)
Adjusted-R^2	0.08	0.07	0.08	0.08
N	9,281	9,281	9,281	9,281

This table presents regression results that are based on a subset of repeat sales that did not involve any dispensary openings or closings and have purchase and sale dates between the 2006 to 2012 time-frame (We count the number of dispensaries in a zip-code that appear over the 2006-2012 period and were not present in 2006:Q1 ("openings"), and the number of dispensaries in a zip-code that appear at any point in the sample time-frame but are not present in 2012:Q4 ("closings")). The dependent variable is ln(SP/PP). #Pills/#Pharmacies and #Pills/#Properties are the standardized measures of pills dispensed by all dispensaries. #Pills/#Pharmacies (Distributor) and #Pills/#Properties (Distributor) are the standardized measures of pills dispensed by distributor-pharmacies. A three-way interaction fixed effect for purchase-year-quarter, sale-year-quarter, and the county code is included in each regression. Robust standard errors are noted in parentheses. *, ** and *** depict significance at the 10%, 5%, and 1% level, respectively

Table 10 Regression results relating number of pills and house price changes - High opioid areas

	(1)	(2)	(3)	(4)
#Pills/#Pharmacies (in 10,000s)	-0.0015***			
	(0.0004)			
#Pills/#Properties (in 1,000s)		-0.0495*		
		(0.0259)		
#Pills/#Pharmacies (Distributor, in 10,000s)			-0.0052***	
			(0.0011)	
#Pills/#Properties (Distributor, in 1,000s)				-0.3936***
				(0.1348)
Constant	-0.0241	-0.0623***	-0.1070***	-0.1281***
	(0.0210)	(0.0161)	(0.0177)	(0.0194)
Adjusted-R^2	0.18	0.16	0.18	0.18
N	53,256	53,257	35,304	35,304

This table presents regression results that are based on a subset of repeat sales, between the 2006 to 2012 time-frame, in high volume opioid areas, i.e., areas above the 25th-percentile of dispense. The dependent variable is ln(SP/PP). #Pills/#Pharmacies and #Pills/#Properties are the standardized measures of pills dispensed by all dispensaries. #Pills/#Pharmacies (Distributor) and #Pills/#Properties (Distributor) are the standardized measures of pills dispensed by distributor-pharmacies. A three-way interaction fixed effect for purchase-year-quarter, sale-year-quarter, and the county code is included in each regression. Robust standard errors are noted in parentheses. *, ** and *** depict significance at the 10%, 5%, and 1% level, respectively

Table 11 Regression results relating number of pills and house price changes - Accounting for outliers

	(1)	(2)	(3)	(4)
#Pills/#Pharmacies (in 10,000s)	-0.0031***			
	(0.0004)			
#Pills/#Properties (in 1,000s)		-0.1554***		
		(0.0401)		
#Pills/#Pharmacies (Distributor, in 10,000s)			-0.0080***	
			(0.0012)	
#Pills/#Properties (Distributor, in 1,000s)				-0.5863***
				(0.1586)
Constant	0.0350*	-0.0203	-0.0892***	-0.1216***
	(0.0197)	(0.0192)	(0.0172)	(0.0202)
Adjusted-R^2	0.18	0.18	0.18	0.18
N	56,729	58,015	34,594	34,593

This table presents regression results that are based on a subset of repeat sales between the 2006 to 2012 time-frame, and involve dispense between the top and bottom percentile of the distribution of dispense. The dependent variable is ln(SP/PP). #Pills/#Pharmacies and #Pills/#Properties are the standardized measures of pills dispensed by all dispensaries. #Pills/#Pharmacies (Distributor) and #Pills/#Properties (Distributor) are the standardized measures of pills dispensed by distributor-pharmacies. A three-way interaction fixed effect for purchase-year-quarter, sale-year-quarter, and the county code is included in each regression. Robust standard errors are noted in parentheses. *, ** and *** depict significance at the 10%, 5%, and 1% level, respectively

References

Addiction Center (2020). The Opioid Epidemic. Available at https://www.addictioncenter.com/opiates/opioid-epidemic/.

Bailey, M. J., Muth, R. F., & Nourse, H. O. (1963). A Regression Method for Real Estate Price Index Construction. *Journal of the American Statistical Association, 58*(304), 933–942.

Case, A., & Deaton, A. (2020). *Deaths of Despair and the Future of Capitalism*. Princeton University Press.

Case, K. E., & Shiller, R. (1989). The Efficiency of the Market for Single Family Homes. *American Economic Review, 79*(1), 125–37.

Cepeda, M. S., Fife, D., Yuan, Y., & Mastrogiovanni, G. (2013). Distance traveled and frequency of interstate opioid dispensing in opioid shoppers and nonshoppers. *Journal of Pain, 14*(10), 1158–1161.

Custodio, C., Cvijanovic, D., and Wiedemann, M. (2021). Opioid crisis and real estate prices.

D'Lima, W., Lopez, L.A., and Pradhan, A. (2020). COVID-19 and housing market effects: Evidence From US Shutdown Orders. Available at SSRN 3647252.

Drug Rehab (2020). Strongest Pain Pills. Available at https://www.drugrehab.com/addiction/opioid-strength/.

Edlund, M. J., Martin, B. C., Russo, J. E., DeVries, A., Braden, J. B., & Sullivan, M. D. (2014). The role of opioid prescription in incident opioid abuse and dependence among individuals with chronic noncancer pain: the role of opioid prescription. *The Clinical journal of pain, 30*(7), 557.

Elul, R., Souleles, N. S., Chomsisengphet, S., Glennon, D., & Hunt, R. (2010). What "triggers" mortgage default? *American Economic Review, 100*(2), 490–94.

Evans, W.N. and Lieber, E.M.J. (2019). Origins of the Opioid Crisis and Its Enduring Impact. NBER Working Paper.

Florence, C., Luo, F., Xu, L., & Zhou, C. (2016). The economic burden of prescription opioid overdose, abuse and dependence in the United States, 2013. *Medical care, 54*(10), 901.

Francke, M. and Korevaar, M. (2020). Housing markets in a pandemic: Evidence from historical outbreaks. Available at SSRN 3566909.

Kenan, K., Mack, K., & Paulozzi, L. (2012). Trends in prescriptions for oxycodone and other commonly used opioids in the United States, 2000–2010. *Open Medicine, 6*(2), 41–47.

Ling, D. C., Wang, C., & Zhou, T. (2020). A First Look at the Impact of COVID-19 on Commercial Real Estate Prices: Asset-Level Evidence. *The Review of Asset Pricing Studies, 10*(4), 669–704.

National Institutes of Health (2020a). Opioid addiction. Available at https://ghr.nlm.nih.gov/condition/opioid-addiction#statistics.

National Institutes of Health (2020b). Opioid Overdose Crisis. Available at https://www.drugabuse.gov/drugs-abuse/opioids/opioid-overdose-crisis.

National Institutes of Health (2020c). Opioid Summaries by State. Available at https://www.drugabuse.gov/drugs-abuse/opioids/opioid-summaries-by-state.

Tyndall, J. (2019). Getting high and low prices: Marijuana dispensaries and home values. Real Estate Economics.

Washington Post (2019a). At height of crisis, Walgreens handled nearly one in five of the most addictive opioids. Available at https://www.washingtonpost.com/investigations/2019/11/07/height-crisis-walgreens-handled-nearly-one-five-most-addictive-opioids/.

Washington Post (2019b). Drilling into the DEA's pain pill database. Available at https://www.washingtonpost.com/graphics/2019/investigations/dea-pain-pill-database/.

Washington Post (2019c). Five takeaways from the DEA's pain pill database. Available at https://www.washingtonpost.com/investigations/six-takeaways-from-the-deas-pain-pill-database/2019/07/16/1d82643c-a7e6-11e9-a3a6-ab670962db05_story.html.

Wong, G. (2008). Has SARS infected the property market? Evidence from Hong Kong. *Journal of Urban Economics, 63*(1), 74–95.

EXHIBIT 193

Opioid Crisis and Real Estate Prices[*]

Cláudia Custódio[§]

Imperial College London, CEPR and ECGI

Dragana Cvijanović[¶]

Cornell University

Moritz Wiedemann[‖]

Imperial College London

February 13, 2024

Abstract

We study the effects of opioid usage on real estate prices. Using variation in opioid prescription rates induced by the staggered passage of opioid-limiting legislation, we find that a decrease in opioid usage results in an increase in county-level house prices. This is due to a decrease in mortgage delinquencies and vacancy rates, and an increase in home improvement loans and population inflow, and consistent with an improvement in the quality of local real estate, and an increase in the local demand for space. Our results highlight the need for policy to address the opioid epidemic's economic costs.

1 Introduction

Opioid usage in the United States has surged over the past two decades, resulting in nearly 500,000 deaths from opioid-related overdoses between 1999 and 2019, according to the Centers for Disease Control and Prevention.[1] The National Institute on Drug Abuse estimates that in 2017 alone, 1.7 million Americans suffered from substance use disorders related to prescription opioid pain relievers, with documented public health and economic consequences.[2] While the existing literature has mainly focused on analyzing the role of economic conditions in the bulging opioid crisis and "deaths of despair" (Case and Deaton, 2015; Finkelstein et al., 2022), fewer studies have examined the impact of the opioid crisis on the real economy (Ouimet et al., 2021; Harris et al., 2019; Cornaggia et al., 2022). We contribute to the understanding of this problem by estimating the impact of opioid abuse on real estate values.

Opioid abuse has been linked to human capital loss and direct costs to families, especially among non-college educated population (Harris et al., 2019; Alpert et al., 2021). Prolonged opioid use can result in reduced labor productivity, leading to lower household income and job loss. As a result, families may be unable to invest in their homes or meet mortgage payments, resulting in an increase in mortgage delinquencies and the number of vacant properties. This can ultimately affect the quality and value of homes in the area. Additionally, opioid abuse can lower the attractiveness of the area by reducing residents' investments in their properties, or through residential sorting (Ahern and Giacolleti, 2022).

Understanding the impact of opioid usage on home values is important because these can act as an indicator of the local economic situation and outlook. Moreover, for a significant number of households, houses are the most valuable asset on their balance sheet (Favilukis et al., 2017). Rising home equity has been shown to help alleviate financing frictions and access to credit (Mian and Sufi, 2011; DeFusco, 2018), and housing collateral has been documented to spur entrepreneurship, new businesses and job creation, as it gives home owners a pledgeable asset that can be used for securing credit (Jensen et al., 2022; Adelino et al., 2015).

To estimate the sensitivity of home values to the usage of prescription opioids we measure home values at the county level using the Zillow Home Value Index (ZHVI), and we use historic opioid prescriptions at the county level reported by the CDC between 2006 and 2018. We start by documenting a negative correlation between home values and opi-

---

[1] https://www.cdc.gov/drugoverdose/epidemic/index.html
[2] https://www.drugabuse.gov/drug-topics/opioids/opioid-overdose-crisis

2

oid prescription rates in the short run and over a 5-year horizon. To do so, we exploit within county (over time) variation, as well as within state-year variation. Using within county variation, we estimate that a one standard deviation increase in dispensed opioid prescriptions per 100 people is associated with an up to 1.35 percentage points cumulative decrease in home values over the following 5 years. Considering that the average home value in our sample is $140,034, this translates into a $1,890 decrease in housing wealth using the within county estimates.[3]

Since 2016, and in response to the opioid crisis, several US states passed laws and regulations limiting opioid prescriptions by physicians to address prescription drug misuse, abuse and overdoses. These laws generally aim to restrict duration or total dosage, in particular for first-time prescriptions, to prevent overly generous prescription and thus reduce addiction and long-term opioid usage.[4] The staggered adoption of regulation by different states arguably induces exogenous variation in prescriptions, as most evidence suggests these are driven by supply (Finkelstein et al., 2022) and not as much by demand for opioids (Currie et al., 2019; Paulozzi et al., 2014).[5] We implement a difference-in-differences empirical test, in which we compare the changes in home values in years before and after the passage of the law (*the treatment*) in *treated* versus *control* counties. We first establish that the passage of these laws indeed reduced opioid prescriptions. Although we also find an increase in overdose death rates after the passage of these laws, possibly due to an increase in usage of illicit drugs in the short run, we establish that the growth in overdose death rates declines as well. This suggests that the regulation effect is likely to operate at the extensive margin of consumption of prescription drugs preventing opioid abuse in the first place. Then, we show that house values in *treated* counties increased on average upon the adoption of these regulations. We document that house values increased by 0.42 percentage points more in the year of the passage of the law, 0.81 percentage points more in the first year, and 1.78 percentage points more in the second year after the passage of the law.

To address the concern in staggered difference-in-differences estimates that already treated units act as control for units that are treated at a later stage (Sun and Abraham, 2021; Callaway and Sant'Anna, 2021), we use interaction weighted estimates by Sun and

---

[3]As a reference point, in 2018, 40% of Americans were not able to cover a $400 emergency with cash, savings or a credit-card charge that they could quickly pay off. https://www.federalreserve.gov/publications/files/2018-report-economic-well-being-us-households-201905.pdf

[4]Nevertheless, there may be unintended consequences of these laws. Patients that are unable to access medical opioids may turn to heroin or other illicit drugs as last resort to reduce their pain.

[5]Ouimet et al. (2021) show that the only variable that significantly predicts passage of these laws in the cross section of states is the (age-adjusted) opioid overdose death rate, while economic conditions or political economy do not seem to play a role. We find similar evidence when replicating their analysis.

3

Abraham (2021). Importantly, as our identifying assumption, we show that states for which the law has passed, and the ones for which it has not, are on parallel trends in terms of home value changes before the passage of the law.[6] Last, we implement a Goodman-Bacon (2021) decomposition and show that our estimates receive a greater weight from the difference between *treated* units and *untreated* ones. This provides further assurance to our estimates, as these differences provide arguably the cleanest comparison.

Since our *treatment* is at the state level, we interact the passage of the state laws with measures of opioid supply at the county level to have a measure of treatment intensity at the same level as the observed outcome. First, we show that the prescription reduction in treated states is driven by the counties with the highest *ex ante* opioid supply within a state, as proxied by the number of ex-ante physicians per capita, and by opioid related payments to physicians by pharmaceutical companies, respectively.[7] Second, we find that home values rise significantly more in these counties upon the passage of the law. Taken together, these results suggest that variation in opioid prescription rates mostly drive the observed change in home values at the county level, and not the other way around.

To explore the possible underlying mechanisms driving the link between opioid prescriptions and home value changes, we study the effect of opioid usage on delinquent mortgages, vacancy rates and home improvement loans. Delinquent mortgages have been shown in the literature to have an impact on home values and could generate negative price spill overs to non-distressed neighbouring houses (e.g Gupta, 2019; Campbell et al., 2011; Anenberg and Kung, 2014). We show that following the staggered adoption of opioid limiting laws the rate of change in mortgage delinquency rates was by about 6.17 percentage points lower on average one year after the passage of the laws in *treated* counties, relative to the control group. We also find that the relative percentage of home improvement loans increased, while the residential vacancy rates decreased significantly more one year after the passage of the laws in *treated* counties, relative to the control group.

In additional analysis, we show that counties that had a higher exposure to opioid usage, subsequently experience a larger outflow of (high-income) households, relative to those with lower exposure to the opioid crisis. This set of results suggests that the degree of impoverishment in response to opioid abuse encourages the unaffected to leave and the affected to stay, consistent with Ambrus et al. (2020) predictions. These findings also illustrate the potential economic costs of spatially correlated shocks induced

---

[6]We also show that the confidence interval of the t=+2 coefficient falls outside of a linear trend based on 50% power following Roth (2022).

[7]Finkelstein et al. (2022) show that number of physicians per capita is a significant predictor of the propensity to prescribe opioids at the county level, while Engelberg et al. (2014) find similar evidence in case of opioid related payments to physicians by pharmaceutical companies.

4

by a pandemic (Gupta et al., 2022), when there are significant externalities from neighbours' socio-economic status. Passage of opioid-limiting laws reverses this trend: following treatment, we observe a significantly larger population and income inflow into treated counties. Taken together, our findings suggest a broader set of channels in which lost labor productivity and household income are one of the drivers of how opioid abuse impacted home values via delinquent mortgages and lower home improvement investments, but also through negative externalities which resulted in spatial redistribution of households.

In additional tests, we address potential measurement concerns and use additional empirical strategies. We use different proxies for opioid abuse, including opioid-related overdose deaths, and we find similar results to our baseline estimates. We also show similar results when we exclude counties that are most likely to contain "pill-mills".

As an additional approach to the difference-in-difference estimate, we utilize spatial regression discontinuity design to estimate the impact of opioid-limiting laws. We compare border counties in states that passed the laws with neighboring counties on the other side of the state border that were not subject to this change. Our results are consistent with the difference-in-differences estimates.

Because our main approach exploits negative variation in opioid usage driven by the passage of the laws, we use an additional alternative methodology that uses positive variation. We follow Cornaggia et al. (2022) and use instrumental variables to estimate the impact of opioid abuse on home values. We instrument opioid abuse using two alternative sources of variation. The first instrument is based on the aggressiveness of Purdue marketing of the product Oxycontin, which induced excessive prescription rates. The second one is based on "leaky" supply chains and the desirability of the product by patients when compared to less available and less attractive pain killers. Overall, the findings using this instrumental variable approach provide support for our baseline results.

Estimating the aggregate economic effects using our empirical approach is a challenging task, given the absence of a general equilibrium model. Although beyond the scope of our study to propose such model, we present back-of-the-envelope calculations of the aggregate economic impact based on our estimates, assuming no other effects of health on wealth and general equilibrium considerations that may have occurred in the economy due to regulatory changes. Our findings indicate that the loss in housing wealth induced by the opioid epidemic between 2006 and 2018 was at least $146 billion, using county and year variation, or $36 billion using state-year variation. By contrast, in 2022, Purdue Pharma agreed to pay $6 billion as part of the settlement to compensate several US states for the damages associated with the opioid crisis.

5

1.1 Literature

Existing evidence on drivers of demand for opioid prescriptions has been mixed.[8] Most of the literature suggests that the observed patterns in opioid usage have been driven by variation in supply of prescription opioids. Since Case and Deaton (2015) a number of studies have shown that economic conditions are not a significant driver of regional patterns of opioid use. In fact, most deaths attributed to opioid abuse occur in states with low unemployment rates (Currie et al., 2019). Finkelstein et al. (2022) show that the differences in the supply of prescription opioids from doctors is a key contributor to opioid abuse, as opposed to patient-specific factors such as mental health or poor economic prospects. The idea that supply-side factors are important determinants of opioid abuse is corroborated by Alpert et al. (2021), who show that the introduction and marketing of OxyContin were important determinants of the opioid crisis. Paulozzi et al. (2014) conclude that opioid prescription rates cannot be explained by variation in the underlying health of the population and instead suggest that the patterns reflect the lack of a consensus among doctors on best practices when prescribing opioids.

Our paper contributes to the rapidly growing literature on the impact of the opioid crisis on the U.S. economy. Harris et al. (2019), Van Hasselt et al. (2015) and Florence et al. (2016) study the impact of the opioid epidemic on human capital. They show a negative impact of opioid prescriptions on labor supply and quantify the costs associated to lost labor productivity. Agarwal et al. (2022), Cornaggia et al. (2022), Ho and Jiang (2021), Li and Zhu (2019), Li and Ye (2022), and Jansen (2022) document financial effects of the crisis, including the impact of opioid abuse on municipal bond rates, firms' stock prices, banks' deposit growth, and consumer credit. Our paper focuses on the impact of the opioid crisis on real estate prices, which is a key indicator of the local economic situation and the most valuable asset on most households' balance sheet.

A few closely related papers also investigate the relationship between the opioid crisis and the local real estate market. Karimli (2022) and Luo and Tidwell (2023) study the implication on the mortgage market and find that lenders are less likely to approve loans from areas with higher rates of opioid abuse. Karimli (2022) further suggests that depressed local house prices by the opioid epidemic have been aggravated by resulting in more defaults using a sample between 2004 and 2017. Ho and Jiang (2021) document a positive impact on real estate prices in Califronia between 2010 and 2018 following regulation that intends to limit opioid overuse, but do not analyse the underlying channel. D' Lima and Thibodeau (2022) use prescription data from Ohio between 2006 and 2012 to

---

[8]See Maclean et al. (2020) for a review

6

document a negative association between home values and opioid usage. Our paper analyzes the magnitudes of these effects, as well as the economic mechanisms behind it, using a national data sample and an identification strategy based on the staggered introduction of opioid supply regulation focusing on a later stage of the opioid crisis.

More broadly, we contribute to the literature that examines the effects of public health conditions on real estate and asset markets, i.e., the impact of health on wealth. Tyndall (2021) studies house price effects of legalized recreational marijuana in Vancouver, Canada, and finds that introduction of marijuana dispensaries imposes a negative price effect on nearby properties. Wong (2008) investigates the effect of the 2003 Hong Kong Severe Acute Respiratory Syndrome (SARS) epidemic on housing markets to find that prices declined by 1%-3% for affected housing complexes. Using data from 7th-century Amsterdam plague-, and 19th-century Paris cholera outbreaks, Francke and Korevaar (2021) show that the outbreaks resulted in large declines in home values, and smaller declines in rent prices. Our paper belongs to the nascent line of research that studies the effects of (global) pandemics on real estate and housing markets (Gupta et al., 2022).

2 Opioid crisis background

The opioid crisis in the US evolved in three waves (Maclean et al., 2021). The first wave started in the mid-1990s and continued through 2010 and marked itself with an unprecedented increase in prescription opioids. In the 1980s the US medical community adopted a more aggressive approach to pain treatment. Further, the American Academy of Pain Medicine and the American Pain Society advocated for greater use of opioids, arguing that there were minimal long-term risk of addiction from these drugs following the FDA approval of OxyContin (oxycodone controlled-release), a new prescription opioid, in 1995. The Joint Commission on Accreditation of Healthcare Organizations (TJC) further institutionalized this stance in 2001, determining that the treatment and monitoring of pain should be the fifth vital sign.[9] This paved a way for the creation of a new metric upon which doctors and hospitals would be judged.

The second wave from 2010 to 2013 was characterised by a widespread increase in heroin use and deaths. Concerns about the possible over-use of opioid prescriptions for chronic pain conditions gained attention in early 2000s and efforts to reduce opioid prescription may have partly contributed to the diversion of opioid prescriptions and the increase in heroin use.

The current third wave that started in 2013 manifests itself with a movement towards

---

[9]https://www.medpagetoday.com/publichealthpolicy/publichealth/57336

extremely addictive synthetic opioids, in particular fentanyl. Opioid prescription regulations have been tightening further. In 2014, the Agency for Healthcare Research and Quality (AHRQ) concluded that evidence-based medicine to support opioids' use in chronic non-terminal pain is limited at best (Chou et al., 2014). In 2016, the CDC issued a new policy recommendation for prescribing opioids advising amongst others to maximize non-opioid treatment.[10] To address the opioid epidemic the TJC revised and issued new standards on the treatment of pain in 2017.[11] In October of 2017, the US government declared opioid crisis a public health emergency.

Several states have taken specific action to address the opioid epidemic. First measures involved the development of prescription drug monitoring programs (PDMPs) with the goal of enabling doctors to better identify drug-seeking patients. However, many of these programs relied on voluntary participation of providers and they were not welcomed by physicians with, at best, mixed evidence on their effectiveness (Buchmueller and Carey, 2018; Meara et al., 2016; Islam and McRae, 2014). Recent measures were more drastic adopting legislation that explicitly sets limits on opioid prescriptions (with some exceptions such as cancer treatment or palliative care). In 2016, Massachusetts became the first state to limit opioid prescriptions to a 7-day supply for first time users. As of 2018, 32 states have legislation limiting the quantity of opioids which can be prescribed. A description of the state laws and regulations in a map is included in Appendix A.1. These laws seem to be more likely to pass in states that suffer from high rates of deaths related to opioids, as shown in Appendix Table A.I, while other potential determinants such as local economic, health and political characteristics do not seem to be correlated. At the federal level, Medicare also adopted a 7-day supply limit for new opioid patients in 2018.

3 Data

We use several different data sources in our main analysis. We proxy for local opioid abuse with historic opioid prescriptions. The Centres for Disease Control and Prevention reports county level opioid prescriptions sourced from IQVIA Xponent starting in 2006. IQVIA Xponent collects opioid prescriptions as identified by the National Drug Codes from approximately 49,900 retail (non-hospital) pharmacies, which covers nearly 92% of all retail prescription in the United States. Our key independent variable, prescription rate, is the count of annual opioid prescriptions at the county level per 100 people. Panel

---

[10]https://www.cdc.gov/mmwr/volumes/65/rr/rr6501e1.htm

[11]https://www.jointcommission.org/standards/r3-report/r3-report-issue-11-pain-assessment-and-management-standards-for-hospitals/

This preprint research paper has not been peer reviewed. Electronic copy available at: https://ssrn.com/abstract=3712600

A in Table I reports summary statistics. Our data covers an average of 2,823 counties per annum over the 2006-2018 period. The average prescription rate corresponds to 82.6 opioid prescriptions per 100 people. Average prescription rates and county variation are consistent with the literature and other data sets (Currie et al., 2019; Harris et al., 2019; Ouimet et al., 2021).

To measure average annual home values of a typical house within a county, we use the 2019 revision of the Zillow Home Value Index (ZHVI). This smoothed, seasonally adjusted measure incorporates property hedonic characteristics, location and market conditions from more than 100 million US homes, including new constructions, as well as non-traded homes, to compute the typical value for homes in the 35th to 65th percentile within a county. We calculate 1 to 5-year percentage changes in home values to allow initial prescriptions rates to turn into the onset of drug abuse. From 2006 to 2018, the ZHVI covers on average 2,575 counties per year. The average home value across counties was $140,000 and grew by 1.5% over one year, respectively 5.4% over 5 years with considerable cross-sectional variation (compare Panel B in Table I).

[Insert Table I about here]

We collect additional county-level demographic and economic variables for our analysis. Demographic variables include male population ratio, white population ratio, black population ratio, Indian American population ratio, Hispanic population ratio, age 20-64 ratio, age over 65 ratio and migration flow and are obtained from the Census Bureau. Neoplasms mortality is obtained from CDC. The number of primary care physicians excluding hospital residents or age 75 years or over is obtained from the Area Health Resources Files of the Health Resources & Service Administration. Economic variables include poverty ratio and median household income obtained from the Census Bureau, as well as unemployment rate and labour force participation rate obtained from Bureau of Labour Statistics. These variables are normalized by contemporaneous county population and winsorized at the 2 and 98 % level.

Starting with Massachusetts in 2016, several states passed laws or regulations to limit opioid prescriptions.[12] We collect information on the limits and the year of the passage of these opioid prescription limiting state laws.[13] Including Massachusetts, 9 states passed

---

[12]We consider both laws and regulations as they are similar in their restrictions and both legally binding. We refer to them jointly as law. If multiple laws were passed by both the house and senate, we consider the year of the first law passed as it initiated the first restrictions. Laws differ in the level of restrictions. However, all laws, even if a second law was passed, limit opioid prescriptions.

[13]For an overview of the laws https://ballotpedia.org/Opioid_prescription_limits_and_policies_by_state

9